

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment			
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	
	NRAO All Funding														
	Observatory Science Operations														
	Observatory Time Allocation														
1	PST will be updated to support the observing modes for 2 Calls for Proposals (for 2013B and 2014A)	03/29/13 09/30/13													
2	The final revisions and restructuring of the PHT will be complete, to include LST pressure plotting for the VLBA in time for the 2013B TAC and will be updated for 2014A TAC	03/29/13 09/30/13													
3	Plan of work specifying procedure for joint ALMA NRAO NA proposal and scheduling activities complete	09/30/13													
	Scientific User Services														
	<i>Helpdesk/User Forums</i>														
4	Upgrade to ensure transfer of tickets and knowledgebase articles from Kayako v3.0 into Kayako v4.0 complete	12/31/12													
5	Dedicated pipeline department setup in NRAO helpdesk system and new Kayako v4.0 deployed to international ALMA community	03/29/13													
	<i>User Documentation</i>														
6	Update of 'casaguides' for 6th CASA Release	12/31/12													
7	All relevant OPT documentation converted to PLONE	03/29/13													
8	Final conversion of GBT relevant user documentation into PLONE	06/28/13													
9	Update of 'casaguides' for 7th CASA release	09/30/13													
	<i>Data Processing</i>														
10	Automated calibration of standard VLA observations completed	12/31/12													
11	Access by external user for initial version of VLA pipeline reprocessing	03/29/13													
12	Deployment of ALMA pipeline for reduction of Cycle 1 data products	06/28/13													
13	Final version of VLA pipeline reprocessing via AAT in place	09/30/13													
14	Final version of the cluster scheduling system deployed	09/30/13													
	<i>Science Software Development (CASA)</i>														
15	CASA upgrade 4.0: migration of Python Binding infrastructure, support for ALMA and EVLA Low Frequency Polarization, focus on system performance and parallelization	12/31/12													
16	CASA Upgrade 4.1: robustness and usability of parallel code, imaging infrastructure cleanup for usability and flexibility, pipeline integration	06/28/13													
17	First draft of cookbook for combining GBT and VLA spectral line and continuum data complete	09/30/13													
	<i>ObsPrep Software</i>														
18	OPT release will include capabilities, resource set-ups, and documentation ready for VLA Full Science Operations	12/31/12													
19	SCHED release ready for VLBA dual-RDBE 8-channel configuration	06/28/13													
	<i>Data Access Software</i>														
20	ASA query and retrieval tool deployed	03/29/13													
	<i>Applications Software: Splatologue</i>														
21	New line lists sent to the ALMA OT and CASA	03/29/13													
22	User interfaces within the OPT and GBTIDL completed	06/28/13													
23	New spectral line visualization and modeling tool released	09/30/13													
	<i>Software Research & Development</i>														
24	Resolve the outstanding numerical issues in the combined MS-MFS and Wide-band A-Projection algorithm	12/31/12													
25	Implement the algorithm in the test CASA code branch, with parallelization	06/28/13													
26	Develop and formalize algorithm development plan	06/28/13													
	<i>Data Management (See CIS)</i>														

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL
	Observatory Telescope Operations													
	ALMA Construction													
27	Complete AAER	12/31/12												
28	Complete AOS power and fiber optic connections to antenna stations	12/31/12												
29	Deliver nutator unit 1	12/31/12												
30	Deliver nutator units 2-5	03/29/13												
31	Complete OPT acceptances	12/31/12												
32	Deliver Band 10 WCAs to OSF	12/31/12												
33	Deliver Band 10 WCAs to OSF	03/29/13												
34	Deliver FE test set	12/31/12												
35	Deliver FEHV unit 1 to OSF	12/31/12												
36	Deliver FEHV units 2-4 to OSF	03/29/13												
37	Deliver BE AA Test Stand	12/31/12												
	EVLA Construction													
38	All hardware delivered and under NM Ops purview	12/31/12												
39	All construction equipment and space transferred to NM Ops	12/31/12												
40	Risk Plan closed out	12/31/12												
41	All WBS project accounts closed	03/29/13												
42	Documents complete and archived	06/28/13												
43	Project successes documented	06/28/13												
44	Project lessons learned documented	06/28/13												
45	Construction report complete	06/28/13												
46	Final cryogenic system installed on antennas	12/31/12												
47	Final X-Band receiver installed on antennas	12/31/12												
48	Final Ku-Band receiver installed on antennas	12/31/12												
49	Computing hardware purchased	12/31/12												
	VLA Commissioning and Support													
50	Support semester 2012B Early Science observing	12/31/12												
51	Complete commissioning of capabilities offered for 2013A	12/31/12												
52	Begin full operations (capabilities offered for FY 2012 Q4 CfP)	03/29/13												
53	Define and document capabilities for semester 2013B CfP	12/31/12												
54	Support semester 2013B CfP	03/29/13												
55	Complete commissioning of capabilities offered for 2013B	06/28/13												
56	Support semester 2013B observing	09/30/13												
57	Define and document capabilities for semester 2014A CfP	06/28/13												
58	Support semester 2014A CfP	09/30/13												
	VLA Modifications/Upgrade Projects													
	VLA Prototype Replacement ACU Milestones													
59	Critical Design Review prior to installation in antenna	03/29/13												
60	Install hardware system into a lab prototype	03/29/13												
61	Integrate full software system	03/29/13												
62	Testing, fine tuning, and operational evaluation complete	06/28/13												
63	Install a fully functional system in an antenna	09/30/13												
	VLBA Infrastructure Modifications/Upgrade Projects													
64	Narrow-bandwidth modes verified	12/31/12												
65	Transition of legacy proposals to DDC completed	03/29/13												
66	Second RDBE & network switch installed at all stations	03/29/13												
67	Scientific VLBI observations started in a subset of modes	03/29/13												

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment			
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	
	GBT Modifications/Upgrades Projects														
	<i>Digital Servo Replacement</i>														
68	Control kernel delivered into integration test lab	12/31/12	Green	Yellow	Yellow	Green	Red	Yellow	Green	Red	Yellow	Green	Red	Yellow	
69	Integration tests complete	06/28/13							Green	Red	Yellow				
70	GBT Acceptance tests complete	09/30/13										Green	Red	Yellow	
71	GBT Axle encoders installed	09/30/13										Green	Red	Green	
	<i>Multi-color Tipper</i>														
72	Complete mitigation efforts	03/29/13													
73	Initial characterization of instrument	09/30/13										Green	Yellow	Green	
74	Regular weather information available to observers	09/30/13										Green	Yellow	Green	
	<i>GBT Sub-reflector Actuator Replacement</i>														
75	Actuator replacements complete	03/29/13				Green	Yellow	Green	Green	Red	Green				
76	Updated focus tracking model	03/29/13				Green	Yellow	Green	Green	Red	Green	Green	Red	Green	
	20m Telescope Modification/Upgrade Projects														
	<i>RadioSkyNet</i>														
77	L-Band receiver installed on 20m	12/31/12	Green	Yellow	Green										
78	Telescope refurbishment complete	12/31/12	Green	Yellow	Green										
79	Skynet science reaches 'operational phase'	03/29/13													
	Observatory Development Programs														
	Central Development Laboratory														
	<i>Low Noise Amplifiers</i>														
80	Test 68-90 GHz LNA using cryo3 devices	12/31/12	Green	Green	Green										
81	Test 33-50 GHz LNA using cryo3 devices	03/29/13	Green	Blue	Green										
82	Test 75-120 GHz LNA using cryo3 devices	06/28/13							Green	Yellow	Green				
83	Resolve issue of "gate-induced noise" in CMOS devices	09/30/13													
84	Compare SiGe HBT LNAs to InP HFET LNAs	09/30/13													
85	Measure 35nm MMIC LNAs from APRA-3 wafer	03/29/13							Green	Yellow	Green				
	<i>Millimeter/Sub-Millimeter Detectors</i>														
86	Measure 375-500 GHz balanced mixer	12/31/12	Green	Green	Green										
87	Measure band 6 balanced mixer (Nb/AlOx/Nb junction)	03/29/13							Green	Yellow	Green				
88	Measured band 6 mixer with Nb/AlN/Nb junction	06/28/13							Green	Yellow	Green	Green	Yellow	Green	
89	Develop and test Nb/Al-AIN/NbTiN SIS junctions	09/30/13										Green	Yellow	Green	
	<i>Optics and Electromagnetic Components</i>														
90	Test 33-50 GHz turnstile junction OMT	12/31/12	Green	Green	Green										
91	Test 67-90 GHz turnstile junction OMT	03/29/13						Green	Yellow	Green	Green	Blue	Yellow	Green	
92	Develop corrugated horn with 3:1 useful bandwidth	09/30/13													
93	Develop optimized spline feed horn for 900 GHz	09/30/13											Blue	Yellow	
	<i>Phased Array Feeds</i>														
94	Fiber installations complete	12/31/12	Green	Yellow	Green				Green	Yellow	Green				
95	Control software complete	03/29/13							Green	Yellow	Green				
96	New BYU signal processor received and tested	06/28/13							Green	Yellow	Green	Green	Yellow	Green	
97	Current PAF tested on GBT	09/30/13										Green	Yellow	Green	
98	Fabrication of lower-noise LNAs complete	03/29/13						Yellow	Yellow	Yellow					
99	Dipoles and spacing for next-gen PAF optimized for GBT	09/30/13										Green	Yellow	Green	
100	Develop parametric model of dipole PAF	09/30/13										Green	Yellow	Green	
	<i>Next Generation Receivers</i>														
101	Cryogenic measurement of S-band triangular digital OMT	06/28/13							Green	Yellow	Green	Green	Yellow	Green	
102	Snapshot noise spectra though unformatted digital fiber-optic link	06/28/13							Green	Yellow	Green				
103	Measure W-band LO distributor	09/30/13										Blue	Yellow	Yellow	
104	Measure flexible thermal transition	03/29/13						Green	Yellow	Green					
105	Measure 67-93 GHz IQ downconverter module	06/28/13							Green	Yellow	Green				
106	Develop 100-1000 GHz wideband triple-ridged feed horn	09/30/13										Blue	Yellow	Green	

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL
	<i>PAPER/HERA</i>													
107	Ship first 25 elements of upgrade	12/31/12	Green	Green	Green									
108	Ship second 25 elements of upgrade	03/29/13	Green	Green	Green		Yellow	Green						
109	Ship third 25 elements of upgrade	06/28/13	Green	Green	Green				Green	Green	Green			
110	Deployment of 128-element array in South Africa	09/30/13	Green	Green	Green							Green	Green	Green
111	Complete strawman design of the next HERA instrument	09/30/13										Blue	Blue	Blue
	<i>DARE</i>													
112	Develop calibration technique using temperature dependent models of the front-end	03/29/13	Green	Green	Green		Yellow	Green						
113	Refinements to the antenna and front-end electronics for the spacecraft	09/30/13												
	ALMA Development													
	<i>Band 5 Local Oscillator</i>													
114	"Kick-off" meeting	12/31/12	Green	Green	Green									
115	Band 5 pre-production LO built & test complete	12/31/12	Green	Green	Green									
116	Frequency doublers procurement and test complete	12/31/12	Green	Green	Green									
117	Integration and test with Band 5 cold cartridge complete	12/31/12	Green	Yellow	Yellow		Red	Yellow						
118	Band 5 LO Critical Design & Manufacturing Readiness Review	03/29/13	Green	Green	Green		Red	Yellow	Green	Red	Green			
119	Production start	06/28/13							Green	Yellow	Green			
120	First 33 WCAs and 16 multiplier delivered	09/30/13										Yellow	Yellow	Green
	<i>2nd Generation Receiver for ALMA Band 6</i>													
121	"Kick-off" meeting	12/31/12	Green	Green	Green									
122	Preliminary definition of instrument requirements	06/28/13							Green	Green	Green			
123	Intermediate performance review	06/28/13							Green	Green	Green			
124	Technical specifications established	06/28/13							Green	Green	Green			
125	Conceptual design complete	09/30/13										Green	Green	Green
126	Final report	09/30/13										Red	Green	Green
	<i>Design Study for Production of Band 2 Cartridges</i>													
127	"Kick-off" meeting	12/31/12	Green	Green	Green									
128	Draft specifications & ICD	12/31/12	Green	Green	Green									
129	MMIC LNA delivered to ARO	12/31/12	Green	Green	Green									
130	MIC LNA delivered to ARO	12/31/12	Green	Green	Green									
131	Band 2 OMT and horn demonstrated	06/28/13							Yellow	Yellow	Yellow	Red	Yellow	Yellow
132	Modifications to 12m receiver inserts complete	06/28/13	Green	Blue	Green									
133	Intermediate performance review	09/30/13										Green	Green	Green
134	Optics report complete	09/30/13										Red	Yellow	Yellow
135	Prototype Band 2 downconverter complete	09/30/13										Green	Green	Green
136	ARO 12m observations using prototype LNAs complete	09/30/13										Green	Green	Green
137	Band 2 Science Workshop	09/30/13										Green	Green	Green
138	Final report	09/30/13										Red	Yellow	Yellow
	<i>mm/submm VLBI with ALMA</i>													
139	"Kick-off" meeting	03/29/13	Green	Blue	Green									
140	Intermediate performance review	06/28/13												
141	Final definition of instrument concept requirements	06/28/13												
142	Final report	06/28/13							Green	Yellow	Green	Green	Green	Green
	<i>Increase the ALMA Data Rate</i>													
143	"Kick-off" meeting	06/28/13							N/A	N/A	N/A	N/A	N/A	N/A
144	Intermediate performance review	09/30/13										N/A	N/A	N/A
145	Final definition of instrument concept requirements	09/30/13										N/A	N/A	N/A
146	Final report	09/30/13										N/A	N/A	N/A
	<i>Ultra-Wideband Quantum Limited Amplifiers</i>													
147	"Kick-off" meeting	12/31/12	Green	Green	Green									
148	Intermediate performance review	03/29/13	Green	Blue	Green									
149	Final definition of instrument concept requirements	06/28/13												
150	Final report	06/28/13												

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment			
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	
	<i>Unleashing Large Dataset Science</i>														
151	"Kick-off" meeting	12/31/12	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
152	Intermediate performance review	03/29/13	Gray	Gray	Gray	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray
153	Final definition of instrument concept requirements	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Gray	Gray	Gray	Gray
154	Final report	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Green
	<i>A Visualization Portal for ALMA Data</i>														
155	"Kick-off" meeting	03/29/13	Gray	Gray	Gray	Green	Blue	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray
156	Intermediate performance review	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
157	Final definition of instrument concept requirements	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
158	Final report	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
	<i>ALMA Band 1 Receiver Development Study</i>														
159	Science & functional requirements definition	03/29/13	Gray	Gray	Gray	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray
160	Technical specifications	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
161	Technical description of the Band 1 receiver and major subcomponents	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Green
162	Proposed production cost estimate	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Green
163	Proposed production schedule	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Green
164	Final report	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Green
	VLA Development														
	<i>VLA Low-Frequency Receivers</i>														
165	First observations using 16 receivers with low-band	12/31/12	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
166	18 functional receivers installed	03/29/13	Gray	Gray	Gray	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray
167	24 functional receivers installed	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Green	Blue	Green	Gray	Gray	Gray	Gray
168	Complete array performance memo	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
	<i>Prototype Low-Band Feed Development</i>														
169	Finish building and testing new designs	03/29/13	Gray	Gray	Gray	Green	Yellow	Green	Yellow	Yellow	Yellow	Gray	Gray	Gray	Gray
170	Selection of the best design and PDR for its deployment (if any of the new designs prove acceptable)	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Gray	Gray	Gray	Gray
171	Install final design on an antenna	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
172	CDR for new feed	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Red	Red	Red
	VLBA Development														
	<i>VLBA Synthesizer Development</i>														
173	CDR	03/29/13	Gray	Gray	Gray	Green	Yellow	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray
174	Prototype synthesizer installed at PT station	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Gray	Gray	Gray	Gray
175	Testing and performance evaluation	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
	GBT Development														
	<i>VEGAS Development</i>														
176	Wideband spectrometer mode successfully tested on GBT	12/31/12	Yellow	Yellow	Green	Yellow	Yellow	Green	Yellow	Yellow	Green	Gray	Gray	Gray	Gray
177	All modes completed and integrated into GBT systems	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Red	Red	Yellow	Yellow
178	First test of data streaming analysis by pipeline	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Green	Yellow	Green	Green
	<i>ARGUS (GBT 4x4 Comet Camera)</i>														
179	Focal plane and cryostat Critical Design Review	12/31/12	Green	Green	Green	Green	Green	Green	Green	Green	Green	Gray	Gray	Gray	Gray
180	Provide GBT interface information (ongoing)	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
	<i>GBT MUSTANG 1.5</i>														
181	Cryogenic parts delivered	12/31/12	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
182	Initial cool down	12/31/12	Green	Green	Green	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray
183	Detectors received from NIST	03/29/13	Gray	Gray	Gray	Green	Yellow	Green	Red	Red	Yellow	Yellow	Red	Yellow	Yellow
184	HEMT amplifier delivery	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Green	Green	Green	Green	Yellow	Green	Green
185	First light (lab)	06/28/13	Gray	Gray	Gray	Gray	Gray	Gray	Green	Yellow	Green	Yellow	Red	Yellow	Yellow
186	Software initial integration tests complete (lab)	09/30/13	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Gray	Yellow	Yellow	Green	Green

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL
	Observatory Administrative Services													
	Administration													
	<i>ES&S</i>													
187	Renew certifications for the Safety Technician in New Mexico	09/30/13												
188	The Safety Officer in New Mexico will be trained & certified as a Laser Safety Officer	09/30/13												
189	An ergonomic safety training program will be developed	09/30/13												
190	Program established to reduce energy usage in each location by 5%	09/30/13												
	Business Services													
191	All business units aligned with the WBS in JD Edwards	12/31/12												
192	FY2014 Budget process and materials consistent with POP presentation	03/29/13												
193	Reports created and formatted	06/28/13												
194	Complete renegotiations on lease on the NTC and CDL	09/30/13												
	MIS													
195	Implementation to Chart of Accounts complete	09/30/13												
196	Enhancements to electronic time keeping, payroll, administrative cost pools, and reporting completed	09/30/13												
	CAP													
197	Export Compliance Program implemented across NRAO	12/31/12												
	Human Resources													
	Compensation													
198	An assessment of NRAO's management structure complete.	12/31/12												
199	Updated job descriptions for all NRAO jobs available	03/29/13												
200	An electronic Performance Evaluation Process implemented	03/29/13												
	Benefits													
201	Implementation of the revised HSA/HDHP Plan complete	12/31/12												
	Employee Relations													
202	Complete an assessment of NRAO's Ombudsman Program	12/31/12												
	Training and Development													
203	Ongoing training programs implemented	09/30/13												
	CIS													
	Common Computing Environments													
204	Power and carbon footprint review for Computing resources.	12/31/12												
205	Completion of major OS upgrades.	03/29/13												
206	Install 12 Archive (NM)+ 12 mirror (CV) storage nodes for VLA support.	03/29/13												
207	Implementation of OSO defined DM strategy for archive, HPC and communications	09/30/13												
	Data Management													
208	Implementation of ALMA Science Archive access from the NAAASC Web Portal	12/31/12												
209	Automation of ALMA QA level 2 product delivery from NAAASC to JAO and other ARCs	03/29/13												
210	Upgrade of Observer Helpdesk Kayako V4	06/28/13												
	Information Infrastructure													
211	Web-based user interface for CASA pipeline tasks	12/31/12												
212	Release of an integrated room and resource reservation system	09/30/13												
	Networking and Telecom													
213	Installation of a secure 10Gigabit/s Internet link for the GB site	12/31/12												
214	Upgrade of the Chilean link to SCO	03/29/13												
	Computing Security													
215	Implementation of an integrated Cybersecurity access policy	9/30/2013												

NRAO Quarterly Status Update 4 FY 2013
July - September, 2013

dark gray (completed), blue (early), green (on track), yellow (behind), red (critically behind)

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment			Q3 Performance Assessment			Q4 Performance Assessment		
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL
	Director's Office													
	<i>EPO</i>													
216	Unveil a new public website	09/30/13												
217	Display illustrated NRAO science results in 220+ museums, planetariums, and observatory visitor centers via the ViewSpace program developed by the Space Telescope Science Institute	09/30/13												
218	Produce a new online virtual tour of the NRAO Green Bank facility	09/30/13												
219	Upgrade the VLA Visitor Center with a new, 12-15 minute High Definition visitor center film	09/30/13												
220	Commission the development of an educational online ALMA operations role-playing simulation game	09/30/13												

POP MILESTONE # 3
Observatory Time Allocation
TITLE: Plan for joint ALMA/NRAO NA proposal
and scheduling

- Cost
- Schedule
- Technical

COST: No issues.

TECHNICAL: No issues.

SCHEDULE:

Critical Path	Schedule	Actual
Milestone	Schedule	Actual
Plan of work for joint ALMA NRAO NA proposal and scheduling process	9/30	FY14

RISK:

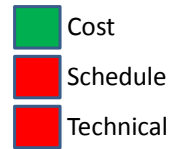
Risk	Mitigation
Top risks	
1 ALMA CFP slippage	Ongoing discussion with with NA ALMA ops and JAO
2 Asynchronous proposal cycles	

SCHEDULE: This goal was not realized as a result of unforeseen delays in the ALMA cycle I call for proposals, which slipped to Q1 in FY 2014 whereas the proposal process for NRAO North American facilities (semester 2014A) will be completed in Q1 FY2014. This goal will be revisited in FY 2014.

POP MILESTONE # 13

Data Processing

TITLE: Final version of VLA pipeline processing via AAT in place






COST: No issues.			TECHNICAL: Investigation indicated that Archive Access Tool (AAT) needed to be redesigned.	
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual	Risk	Mitigation
			Top risks	
Milestone	Schedule	Actual	1 Dependency on AAT.	Divide pipeline processing from AAT
			2 Resource availability	Prioritize work, re-assign resources if needed

SCHEDULE: Work moved to FY 14 POP: Initial design of AAT: 3/31/2013, Prototype of AAT: 9/30/2013, Complete reprocessing interface: 9/30/2013.




TECHNICAL: This milestone was written under the assumption that it would go into the existing AAT, and therefore we can't deliver this milestone at all, however it will be an early deliverable of the "new" archive system.

POP MILESTONE # 26
Software Research & Development
TITLE: Develop and formalize algorithm
development plan

-  Cost
-  Schedule
-  Technical

COST: No issues.			TECHNICAL: No issues.	
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual	Risk	Mitigation
Milestone	Schedule	Actual	ARD plan not developed until FY14	Relevant staff continue to work from existing priorities.
Develop and formalize algorithm development plan	6/28	FY14		

SCHEDULE: Development and implementation of new plan was delayed to FY14 by slower than expected ramp up of SSR SUS. Relevant staff continue to work from existing priorities.

POP MILESTONE # 28			 Cost  Schedule  Technical														
ALMA Construction																	
TITLE: Complete AOS power and fiber optic connections to antenna stations																	
COST: <table border="1"> <thead> <tr> <th>Actuals</th> <th>Expected</th> </tr> </thead> <tbody> <tr> <td>\$50,317k</td> <td>\$51,675k</td> </tr> <tr> <td colspan="2">1. Expected Cost (Budget at Completion)</td> </tr> </tbody> </table>			Actuals	Expected	\$50,317k	\$51,675k	1. Expected Cost (Budget at Completion)		TECHNICAL: <ul style="list-style-type: none"> Fuse disconnectors' specification confirmed compliance with technical specification. CRE signature is still missing Protective Earth (PE) in Low Voltage cable of 51 stations needs improvement. Installation of missing PE is underway 								
Actuals	Expected																
\$50,317k	\$51,675k																
1. Expected Cost (Budget at Completion)																	
SCHEDULE: <table border="1"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>1 Complete AOS Utilities contract</td> <td>30/04/13</td> <td>31/12/13</td> </tr> <tr> <td>2 Complete AOS fuse disconnectors</td> <td>30/10/13</td> <td>31/12/13</td> </tr> </tbody> </table>			Milestone	Schedule	Actual	1 Complete AOS Utilities contract	30/04/13	31/12/13	2 Complete AOS fuse disconnectors	30/10/13	31/12/13	RISK & MITIGATION: <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>Delay of CSV and Early Science until missing PE is installed in some antenna stations</td> <td>Speed solution and look for simpler installation method</td> </tr> </tbody> </table>		Risk	Mitigation	Delay of CSV and Early Science until missing PE is installed in some antenna stations	Speed solution and look for simpler installation method
Milestone	Schedule	Actual															
1 Complete AOS Utilities contract	30/04/13	31/12/13															
2 Complete AOS fuse disconnectors	30/10/13	31/12/13															
Risk	Mitigation																
Delay of CSV and Early Science until missing PE is installed in some antenna stations	Speed solution and look for simpler installation method																

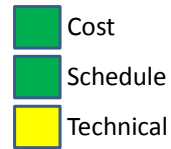
COST: New BCRs are in the approval process to cover the cost to complete activities for the AOS Utilities work.

SCHEDULE: The Contractor is behind schedule in finishing the work and the harsh winter conditions delayed even further the completion of the work to Q1 FY2014 (December 2013). The work on the Extended Array power disconnectors is ongoing with some delays due to the harsh winter weather and the ALMA employee's strike; this work will proceed in until Q1 2014 (December 2013).

TECHNICAL: The low voltage (400 V) cables between transformers and antenna stations for a number of locations within the inner array were not installed in accordance with the technical specifications as a protective earth (PE) is missing. As a corrective measure the PE cable shall be installed. The main problem with implementing this solution is that the soil immediately above the cable that needs to be exposed is frozen and efforts to expose it may damage the cable. Special techniques were tested to thaw the soil and reach the buried cable, install the PE and tie it with the PE cable. Once the excavation tests were successful, contracts were issued to install the missing cable. Completion of this work is expected in late November 2013.

Risk: Delay of CSV and Early Science. **Mitigation:** speed up the installation of the PE without compromising safety of personnel and equipment.

POP MILESTONE # 30
ALMA Construction
TITLE: Deliver nutator units 2 – 5



COST: Total Nutator System: <table border="1"> <tr> <th>Actuals</th> <th>Expected</th> </tr> <tr> <td>\$1,939k</td> <td>\$2,030k</td> </tr> </table> Units #2-5 Delivery & Acceptance: <table border="1"> <tr> <th>Actuals</th> <th>Expected</th> </tr> <tr> <td>\$0k</td> <td>\$322k</td> </tr> </table>			Actuals	Expected	\$1,939k	\$2,030k	Actuals	Expected	\$0k	\$322k	TECHNICAL: <ul style="list-style-type: none"> Nutator Units #2 – 5 are now Conditionally Accepted by JAO Mirror surface of Unit #1 shows some signs of possible degradation 						
Actuals	Expected																
\$1,939k	\$2,030k																
Actuals	Expected																
\$0k	\$322k																
SCHEDULE: <table border="1"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>1. JAO acceptance of Nutator #2-3</td> <td>28/02/13</td> <td>24/09/13</td> </tr> <tr> <td>2. JAO acceptance of Nutator #4-5</td> <td>24/03/13</td> <td>25/09/13</td> </tr> </tbody> </table>			Milestone	Schedule	Actual	1. JAO acceptance of Nutator #2-3	28/02/13	24/09/13	2. JAO acceptance of Nutator #4-5	24/03/13	25/09/13	RISK & MITIGATION: <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>1. Mirror surface coating performance</td> <td>RF performance to be monitored during commissioning; NAAIPT to hold retainage for recoating if necessary</td> </tr> </tbody> </table>		Risk	Mitigation	1. Mirror surface coating performance	RF performance to be monitored during commissioning; NAAIPT to hold retainage for recoating if necessary
Milestone	Schedule	Actual															
1. JAO acceptance of Nutator #2-3	28/02/13	24/09/13															
2. JAO acceptance of Nutator #4-5	24/03/13	25/09/13															
Risk	Mitigation																
1. Mirror surface coating performance	RF performance to be monitored during commissioning; NAAIPT to hold retainage for recoating if necessary																




COST: Cost for Nutator delivery is on track; Unit #1 Acceptance cost included here as it was not invoiced until after end of Q3.

SCHEDULE: Units #2 through #5 were conditionally accepted by ALMA JAO on 24 September.

TECHNICAL: The surface of the mirror of Unit #1 shows a dark shadow area over ~20% of the surface; the concern is this may be a reoccurrence of the coating failures previously identified in 2011.

RISK & MITIGATION: During commissioning of Unit #1, the RF performance will be compared to the RF performance of other Antennas have the standard (solid) aluminum subreflectors; if this unit is found to have significantly lower RF performance, then the mirror will be removed for recoating by the Contractor. NAAIPT will hold some of the retainage amount owed the Contractor to ensure satisfactory completion of this task.

POP MILESTONE # 31
ALMA Construction
TITLE: Complete OPT acceptances

-  Cost
-  Schedule
-  Technical

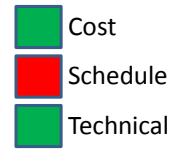
COST: <table border="1"> <thead> <tr> <th>Actuals</th> <th>Expected</th> </tr> </thead> <tbody> <tr> <td>\$769 k</td> <td>\$812 k</td> </tr> </tbody> </table>		Actuals	Expected	\$769 k	\$812 k	TECHNICAL: <ul style="list-style-type: none"> • None: all OPT units perform satisfactorily • Final acceptance pending delivery of updated documentation 							
Actuals	Expected												
\$769 k	\$812 k												
SCHEDULE: <table border="1"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>1. JAO acceptance of OPTs #3 - #6</td> <td>25/02/13</td> <td>20/11/13</td> </tr> </tbody> </table>		Milestone	Schedule	Actual	1. JAO acceptance of OPTs #3 - #6	25/02/13	20/11/13	RISK & MITIGATION: <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>1. Additional schedule delay</td> <td>Continue to monitor documentation delivery. Encourage JAO acceptance.</td> </tr> </tbody> </table>		Risk	Mitigation	1. Additional schedule delay	Continue to monitor documentation delivery. Encourage JAO acceptance.
Milestone	Schedule	Actual											
1. JAO acceptance of OPTs #3 - #6	25/02/13	20/11/13											
Risk	Mitigation												
1. Additional schedule delay	Continue to monitor documentation delivery. Encourage JAO acceptance.												

COST: Cost for OPT acceptances is on track.

SCHEDULE: All OPTs have been delivered to Chile and acceptance testing of all units is complete. ACRVs for the units are delayed pending delivery of final documentation from the vendor (updated drawings, operations manual and software manual). While delivery is behind schedule, OPTs currently are not needed within the project. Consequently, unit acceptance is a low priority for JAO in comparison to other deliverables.

RISK & MITIGATION: NA AIPT continues to closely monitor documentation delivery and will encourage JAO to facilitate acceptance upon documentation delivery.

POP MILESTONE # 35 & 36
ALMA Construction
TITLE: Deliver FEHV units 1 – 4



COST: <table border="1"> <thead> <tr> <th>Actuals</th> <th>Expected</th> </tr> </thead> <tbody> <tr> <td>\$316 k</td> <td>\$611 k ¹</td> </tr> </tbody> </table> <p>(1) Expected Cost (Budget at Completion) includes a Budget Change Request for \$340k.</p>		Actuals	Expected	\$316 k	\$611 k ¹	TECHNICAL: <ul style="list-style-type: none"> • Design is mature to make a first unit and test it • Fabrication contract for unit #1 will be in place in early Q1 FY2014 										
Actuals	Expected															
\$316 k	\$611 k ¹															
SCHEDULE: <table border="1"> <thead> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>1. Fabrication and acceptance of Unit #1</td> <td>6/1/13</td> <td>1/31/14</td> </tr> <tr> <td>2. Fabrication of Units #2-4</td> <td>11/1/13</td> <td>8/31/14</td> </tr> </tbody> </table>		Milestone	Schedule	Actual	1. Fabrication and acceptance of Unit #1	6/1/13	1/31/14	2. Fabrication of Units #2-4	11/1/13	8/31/14	RISK & MITIGATION: <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>Delay in antenna maintenance due to slower FE handling equipment</td> <td>JAO has alternate FE handling equipment</td> </tr> </tbody> </table>		Risk	Mitigation	Delay in antenna maintenance due to slower FE handling equipment	JAO has alternate FE handling equipment
Milestone	Schedule	Actual														
1. Fabrication and acceptance of Unit #1	6/1/13	1/31/14														
2. Fabrication of Units #2-4	11/1/13	8/31/14														
Risk	Mitigation															
Delay in antenna maintenance due to slower FE handling equipment	JAO has alternate FE handling equipment															

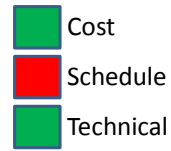
COST: Budget change request approved for FEHV cost-to-complete. Decision to start production will be made in Q1 FY2014i pending budget availability confirmation.

SCHEDULE: 12 months will elapse to fabricate the 4 units.

TECHNICAL: First test unit will be a proof of concept; any design changes will be retrofitted to it and the subsequent units will be fabricated according to this.

RISK & MITIGATION: JAO has an alternate FE exchange equipment that has been in use for many years. The new FEHV would increase efficiency and safety of the operation, but its unavailability is not stopping the operation.

POP MILESTONE #: 65
VLBA Infrastructure
TITLE: Transition of legacy proposals to DDC completed

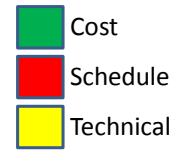


COST:		TECHNICAL:		
Labor Actuals	Expected	Several PIs with ongoing monitoring projects using the legacy data acquisition system have requested that we continue to operate the legacy system into FY 2014 for consistency of instrumental performance and calibration. No technical problems identified.		
Ops funds this activity at a higher WBS level. Delay has no impact.				
Material Actuals	Expected			
\$0	\$0			
Travel Actuals	Expected			
\$0	\$0			
SCHEDULE:		RISK:		
Critical Path	Schedule	Actual	Risk	Mitigation
PI cooperation	3/29/13	9/30/13	Legacy formatter fails on one or more stations	PIs piggyback legacy on DDC system
Milestone	Schedule	Actual		
1 Finish transition	3/29/13	Is now expected to continue into FY 2014		

SCHEDULE: A number of PIs have requested that we maintain the legacy VLBA recording system for ongoing monitoring projects into FY 2014, for consistency of instrumental performance and calibration. We continue to work with individual investigators to participate in “piggyback” observations using both the new and old systems in parallel, to improve acceptance of the new hardware. No new proposals are being accepted for the legacy system. The retirement of the legacy system is now scheduled for FY 2014 Q3.

RISK & MITIGATION: The primary risk associated with not retiring the legacy system is that the legacy formatter may fail, leaving our legacy users with no choice but to transition to the DDC without adequate preparation. The risk of this happening is relatively low, but the formatter is becoming antiquated and is difficult to repair. Detailed instructions are available on the NRAO website to aid PIs in converting their legacy observe files to using the DDC.

POP Milestone #: 68,69,70,71
GBT Upgrade Projects
TITLE: GBT Servo Rep.



COST: <table border="1"> <tr> <th>Labor Actuals</th> <th>Expected</th> </tr> <tr> <td>\$0k</td> <td>\$0k</td> </tr> <tr> <th>Materials Actuals</th> <th>Expected</th> </tr> <tr> <td>\$0k</td> <td>\$0k</td> </tr> <tr> <th>Travel Actuals</th> <th>Expected</th> </tr> <tr> <td>\$0</td> <td>\$0</td> </tr> </table>		Labor Actuals	Expected	\$0k	\$0k	Materials Actuals	Expected	\$0k	\$0k	Travel Actuals	Expected	\$0	\$0	TECHNICAL: <ul style="list-style-type: none"> No work in Q4FY2013 								
Labor Actuals	Expected																					
\$0k	\$0k																					
Materials Actuals	Expected																					
\$0k	\$0k																					
Travel Actuals	Expected																					
\$0	\$0																					
SCHEDULE: <table border="1"> <tr> <th>Critical Path</th> <th>Schedule</th> <th>Actual</th> </tr> <tr> <td>Kernel in Lab</td> <td>Q1FY13</td> <td>[TBD]</td> </tr> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> <tr> <td>Integration tests Complete</td> <td>Q3FY13</td> <td></td> </tr> <tr> <td>Acceptance Tests</td> <td>Q4FY13</td> <td></td> </tr> </table>		Critical Path	Schedule	Actual	Kernel in Lab	Q1FY13	[TBD]	Milestone	Schedule	Actual	Integration tests Complete	Q3FY13		Acceptance Tests	Q4FY13		RISK: <table border="1"> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>1 Availability of resources</td> <td>None; accept risk & delay associated w/downscale</td> </tr> </table>		Risk	Mitigation	1 Availability of resources	None; accept risk & delay associated w/downscale
Critical Path	Schedule	Actual																				
Kernel in Lab	Q1FY13	[TBD]																				
Milestone	Schedule	Actual																				
Integration tests Complete	Q3FY13																					
Acceptance Tests	Q4FY13																					
Risk	Mitigation																					
1 Availability of resources	None; accept risk & delay associated w/downscale																					

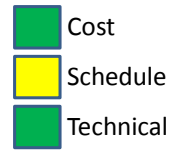
COST: Costs are running behind budget due to lack of resources allocated to the project in Q4-FY2013.

SCHEDULE: The Q1-FY2013 deliverable of an Elevation Axis Control Kernel in the integration environment has been delayed due to resource availability. As noted in POP: *“This is now being run as a background project and as such will have some variability in milestones as staff allocations vary for the project.”*

TECHNICAL: Once resources are restored there will be a ramp-up learning curve for the engineers

RISK & MITIGATION: Resource availability

POP Milestone #: 73,74
GBT Update Projects
TITLE: Multi-color Tipper



COST:			TECHNICAL:	
Labor Actuals	Expected		<ul style="list-style-type: none"> RFI was not able to be controlled by typical mitigation strategies without compromising instrument accuracy. 	
\$	\$			
Materials Actuals				
Travel Actuals	Expected			
\$0	\$0			
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual	Risk	Mitigation
Instrument Install	Q4 FY13	Q1 FY14 (est.)	1. Weather predictions do not improve	1 Accept the current level of accuracy
Milestone	Schedule	Actual	2	2.
1 RFI Mitigation	Q2 FY13	Complete	3	3
2 Characterize	Q4 FY13			
3. Reg. Operations	Q4 FY13			

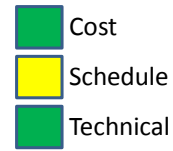
COST: Costs are running below budget due to installation delay.

SCHEDULE: The installation of the tipper has been relocated off of Observatory property due to the amount of RFI created by the instrument. Site location is complete and construction will hopefully begin before winter. This is a lower priority project for the site.

TECHNICAL: The efforts to control instrument RFI were insufficient for Zone #1 or Zone #2 installation on Observatory grounds. There are currently no other technical issues out of tolerance for the SHAO Backend project.

RISK & MITIGATION: The data from the tipper will improve weather predictions and ultimately improve Dynamic Scheduling efficiencies for the GBT. Until then the accuracy remains at previous levels.

POP MILESTONE #: 88
CDL – mm/Sub-mm Detectors
TITLE: Measured band 6 mixer with
Nb/AlN/Nb junction



COST:		TECHNICAL:		
Labor Actuals	Expected	Difficulties due to equipment failures at UVML SIS foundry now overcome.		
\$530,033	\$636,956			
Material Actuals	Expected			
\$21,323		Good Nb/Al-AIN/Nb SIS junctions demonstrated.		
Travel Actuals	Expected			
\$5,619				
SCHEDULE:		RISK:		
Critical Path	Schedule	Actual	Risk	Mitigation
Measure Nb/AlN/Nb mixer	06/28/13	09/30/13	Top three risks	
Milestone	Schedule	Actual	1	
			2	
			3	

COST: Some budgeted labor now in M&A due to decision to delay CDL AD hire, ALMA band 6v2 design study also supporting this work.

SCHEDULE: Completely dependent on technical issues of AlN barrier fabrication (see below).




TECHNICAL: Developing a consistent process for producing high-quality AlN barriers for SIS mixers is at the leading edge of this work. UVML has recently demonstrated excellent Nb/Al-AIN/Nb junctions and are currently fabricating a Band-6 wafer

POP MILESTONE #: 89

CDL – mm/Sub-mm Detectors

TITLE: Develop and test Nb/Al-AIN/NbTiN

SIS junctions

 Cost
 Schedule
 Technical

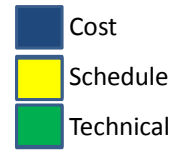
COST:			TECHNICAL:	
Labor Actuals	Expected		Follows on from development of Nb/Al-AIN/Nb SIS junctions	
\$530,033	\$636,956			
Material Actuals	Expected			
\$21,323				
Travel Actuals	Expected			
\$5,619				
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual	Risk	Mitigation
Milestone	Schedule	Actual	Top three risks	
1			1	
2			2	
3			3	

COST: Some budgeted labor now in M&A due to decision to delay CDL AD hire, ALMA band 6v2 design study also supporting this work.

SCHEDULE: Completely dependent on technical issues of AIN barrier fabrication.

TECHNICAL: This work follows on from development of Nb/Al-AIN/Nb SIS junctions – see #88.

POP MILESTONE #: 93
CDL – Optics and EM Components
TITLE: Develop optimized spline feed
horn for 900 GHz



COST:			TECHNICAL:	
Labor Actuals	Expected			
\$91,920	\$150,936			
Material Actuals	Expected			
\$6,133				
Travel Actuals	Expected			
\$2,563				
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual	Risk	Mitigation
Milestone	Schedule	Actual	Top three risks	
1			1	
2			2	
3			3	

SCHEDULE: Work is delayed due to conflicting priorities of other projects.

POP MILESTONE #: 96
CDL – Phased Array Feeds
TITLE: New BYU signal processor
received and tested

- Cost
- Schedule
- Technical

<p>COST:</p> <table border="1"> <caption>Estimated Cost Data</caption> <thead> <tr> <th>Month</th> <th>Accrued</th> <th>Budgeted</th> </tr> </thead> <tbody> <tr><td>Oct</td><td>50,000</td><td>50,000</td></tr> <tr><td>Nov</td><td>70,000</td><td>70,000</td></tr> <tr><td>Dec</td><td>100,000</td><td>100,000</td></tr> <tr><td>Jan</td><td>130,000</td><td>130,000</td></tr> <tr><td>Feb</td><td>160,000</td><td>160,000</td></tr> <tr><td>Mar</td><td>200,000</td><td>200,000</td></tr> <tr><td>Apr</td><td>230,000</td><td>230,000</td></tr> <tr><td>May</td><td>260,000</td><td>260,000</td></tr> <tr><td>Jun</td><td>300,000</td><td>300,000</td></tr> <tr><td>Jul</td><td>340,000</td><td>340,000</td></tr> <tr><td>Aug</td><td>370,000</td><td>370,000</td></tr> <tr><td>Sep</td><td>380,000</td><td>480,000</td></tr> </tbody> </table>	Month	Accrued	Budgeted	Oct	50,000	50,000	Nov	70,000	70,000	Dec	100,000	100,000	Jan	130,000	130,000	Feb	160,000	160,000	Mar	200,000	200,000	Apr	230,000	230,000	May	260,000	260,000	Jun	300,000	300,000	Jul	340,000	340,000	Aug	370,000	370,000	Sep	380,000	480,000	<p>TECHNICAL:</p> <p>BYU sent signal processor to Arecibo for Cornell PAF tests. The signal processor is now at BYU but is available for GBT testing when needed.</p>
Month	Accrued	Budgeted																																						
Oct	50,000	50,000																																						
Nov	70,000	70,000																																						
Dec	100,000	100,000																																						
Jan	130,000	130,000																																						
Feb	160,000	160,000																																						
Mar	200,000	200,000																																						
Apr	230,000	230,000																																						
May	260,000	260,000																																						
Jun	300,000	300,000																																						
Jul	340,000	340,000																																						
Aug	370,000	370,000																																						
Sep	380,000	480,000																																						
<p>SCHEDULE:</p> <p>The BYU signal processor is a wider bandwidth PAF backend developed at BYU under a separate funding program to support multiple initiatives including GBT phased array work. To date the processor has not been tested at NRAO. This is now anticipated in 2014, after first tests with the existing narrower bandwidth backend.</p>	<p>RISK:</p> <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>Top risks</td> <td></td> </tr> <tr> <td>1 Signal processor is in use by other 3rd party (Umass or Arecibo)</td> <td>1. Our schedule is flexible</td> </tr> <tr> <td>2 Signal Processor does not work</td> <td>2. BYU is responsible for the unit performance, and we have the narrow band backend as a backup</td> </tr> </tbody> </table>	Risk	Mitigation	Top risks		1 Signal processor is in use by other 3 rd party (Umass or Arecibo)	1. Our schedule is flexible	2 Signal Processor does not work	2. BYU is responsible for the unit performance, and we have the narrow band backend as a backup																															
Risk	Mitigation																																							
Top risks																																								
1 Signal processor is in use by other 3 rd party (Umass or Arecibo)	1. Our schedule is flexible																																							
2 Signal Processor does not work	2. BYU is responsible for the unit performance, and we have the narrow band backend as a backup																																							

SCHEDULE: The BYU processor is not needed in a strict sense for the main goals of the present PAF work: demonstration of modeling accuracy and beamforming ability. We had tried to fit the BYU processor into our 2013 plans but there were scheduling difficulties on the NRAO side and the BYU side. Our plan now is to wait until after we have made a first demonstration on the GBT before deciding if there is knowledge to be gained by additional testing with the wider bandwidth backend. The recent NSF ATI grant to BYU/WVU is to develop and even wider bandwidth backend, so the NRAO PAF group will continue to work with these groups so that the various parts of a successful PAF effort : front end, signal transport, downconverter, backend, data package can ultimately come together.

POP MILESTONE #: 97
CDL – Phased Array Feeds
TITLE: Current PAF tested on GBT

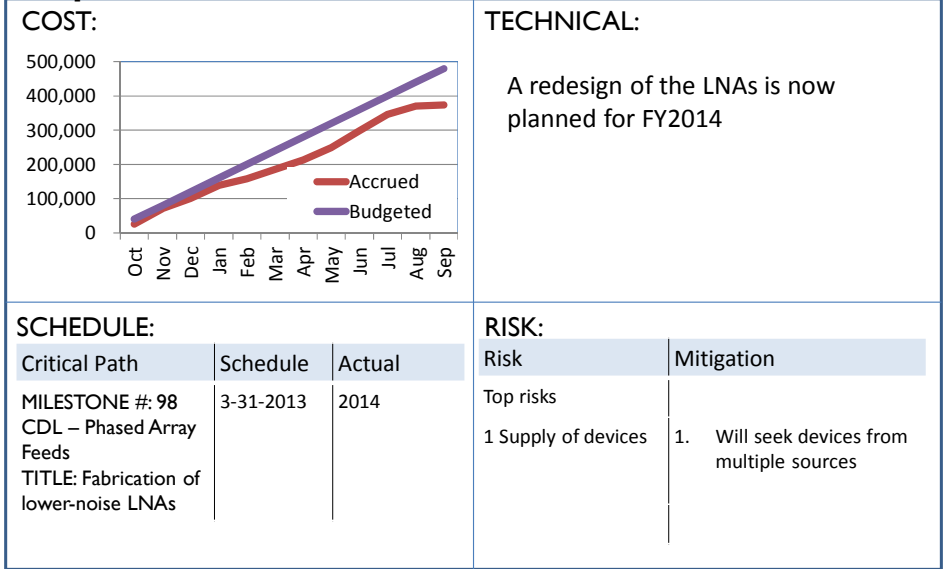
- Cost
- Schedule
- Technical

<p>COST:</p> <table border="1" style="margin-top: 10px; width: 100%; border-collapse: collapse;"> <caption>Estimated Cost Data</caption> <thead> <tr> <th>Month</th> <th>Accrued</th> <th>Budgeted</th> </tr> </thead> <tbody> <tr><td>Oct</td><td>50,000</td><td>50,000</td></tr> <tr><td>Nov</td><td>70,000</td><td>70,000</td></tr> <tr><td>Dec</td><td>100,000</td><td>100,000</td></tr> <tr><td>Jan</td><td>130,000</td><td>130,000</td></tr> <tr><td>Feb</td><td>160,000</td><td>160,000</td></tr> <tr><td>Mar</td><td>200,000</td><td>200,000</td></tr> <tr><td>Apr</td><td>230,000</td><td>230,000</td></tr> <tr><td>May</td><td>260,000</td><td>260,000</td></tr> <tr><td>Jun</td><td>300,000</td><td>300,000</td></tr> <tr><td>Jul</td><td>340,000</td><td>340,000</td></tr> <tr><td>Aug</td><td>370,000</td><td>370,000</td></tr> <tr><td>Sep</td><td>380,000</td><td>480,000</td></tr> </tbody> </table>	Month	Accrued	Budgeted	Oct	50,000	50,000	Nov	70,000	70,000	Dec	100,000	100,000	Jan	130,000	130,000	Feb	160,000	160,000	Mar	200,000	200,000	Apr	230,000	230,000	May	260,000	260,000	Jun	300,000	300,000	Jul	340,000	340,000	Aug	370,000	370,000	Sep	380,000	480,000	<p>TECHNICAL:</p> <p>All hardware and software is in place for the testing</p>
Month	Accrued	Budgeted																																						
Oct	50,000	50,000																																						
Nov	70,000	70,000																																						
Dec	100,000	100,000																																						
Jan	130,000	130,000																																						
Feb	160,000	160,000																																						
Mar	200,000	200,000																																						
Apr	230,000	230,000																																						
May	260,000	260,000																																						
Jun	300,000	300,000																																						
Jul	340,000	340,000																																						
Aug	370,000	370,000																																						
Sep	380,000	480,000																																						
<p>SCHEDULE:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 30%;">Critical Path</th> <th style="width: 35%;">Schedule</th> <th style="width: 35%;">Actual</th> </tr> </thead> <tbody> <tr> <td>MILESTONE #: 97 CDL – Phased Array Feeds TITLE: Current PAF tested on GBT</td> <td>9-30-2013</td> <td>Planned late Oct 2013</td> </tr> </tbody> </table>	Critical Path	Schedule	Actual	MILESTONE #: 97 CDL – Phased Array Feeds TITLE: Current PAF tested on GBT	9-30-2013	Planned late Oct 2013	<p>RISK:</p> <table border="1" style="width: 100%; border-collapse: collapse;"> <thead> <tr> <th style="width: 60%;">Risk</th> <th style="width: 40%;">Mitigation</th> </tr> </thead> <tbody> <tr> <td colspan="2">Top three risks</td> </tr> <tr> <td>1 Schedule affected by gov't shutdown</td> <td>1. Reschedule earliest possible</td> </tr> <tr> <td>2 Low noise amplifier reliability</td> <td>2. Redesign LNAs</td> </tr> </tbody> </table>	Risk	Mitigation	Top three risks		1 Schedule affected by gov't shutdown	1. Reschedule earliest possible	2 Low noise amplifier reliability	2. Redesign LNAs																									
Critical Path	Schedule	Actual																																						
MILESTONE #: 97 CDL – Phased Array Feeds TITLE: Current PAF tested on GBT	9-30-2013	Planned late Oct 2013																																						
Risk	Mitigation																																							
Top three risks																																								
1 Schedule affected by gov't shutdown	1. Reschedule earliest possible																																							
2 Low noise amplifier reliability	2. Redesign LNAs																																							

SCHEDULE: Delays in testing of the Focal L-Band Array for GB (FLAG) receiver on the GBT have accrued from June to the present due to low-noise amplifier failures and reliability (see # 98 for details). One more effort is now being made to carry out this testing. In case of either success or failure of this effort we plan to redesign and replace the amplifiers to improve the receiver in 2014.

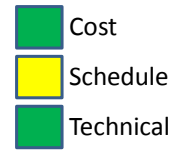
POP MILESTONE #: 98
CDL – Phased Array Feeds
TITLE: Fabrication of lower-noise LNAs
complete

- Cost
- Schedule
- Technical



SCHEDULE: The R&D redesign and fabrication of lower noise LNAs did not occur in 2013 due to the prioritization of the (a) modeling and (b) test/analysis/software as the primary PAF goal has been to demonstrate that we can predict PAF behavior and use PAF receiver to form beams on the sky. For this reason we have used the existing amplifiers. However, we discovered a severe problem with these LNAs, which demonstrate cryogenic failures and oscillations. These appear to be due to the transistor packaging and the module packaging, respectively. This is being addressed in a redesign effort beginning in FY2014 which will use a different transistor.

POP MILESTONE #: 101
CDL – Next Generation Receivers
TITLE: Cryogenic measurement of S-band
triangular digital OMT






COST: <table border="1"> <tr> <th>Labor Actuals</th> <th>Expected</th> </tr> <tr> <td>\$362,150</td> <td>\$462,568</td> </tr> <tr> <th>Material Actuals</th> <th>Expected</th> </tr> <tr> <td>\$66,734</td> <td></td> </tr> <tr> <th>Travel Actuals</th> <th>Expected</th> </tr> <tr> <td>\$2,453</td> <td></td> </tr> </table>			Labor Actuals	Expected	\$362,150	\$462,568	Material Actuals	Expected	\$66,734		Travel Actuals	Expected	\$2,453		TECHNICAL: <p>Issues with CASPER environment and multi-channels ADCs have prompted a switch to a National Instruments platform.</p>												
Labor Actuals	Expected																										
\$362,150	\$462,568																										
Material Actuals	Expected																										
\$66,734																											
Travel Actuals	Expected																										
\$2,453																											
SCHEDULE: <table border="1"> <tr> <th>Critical Path</th> <th>Schedule</th> <th>Actual</th> </tr> <tr> <td>on-sky tests</td> <td>9/30/2013</td> <td></td> </tr> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> <tr> <td>1</td> <td></td> <td></td> </tr> <tr> <td>2</td> <td></td> <td></td> </tr> <tr> <td>3</td> <td></td> <td></td> </tr> </table>			Critical Path	Schedule	Actual	on-sky tests	9/30/2013		Milestone	Schedule	Actual	1			2			3			RISK: <table border="1"> <tr> <th>Risk</th> <th>Mitigation</th> </tr> <tr> <td>1 Horn design too costly. 2 CASPER development environment and ADCs unreliable</td> <td>1 Exploring alternate horn design. 2 Switching to Natl. Inst. platform.</td> </tr> </table>			Risk	Mitigation	1 Horn design too costly. 2 CASPER development environment and ADCs unreliable	1 Exploring alternate horn design. 2 Switching to Natl. Inst. platform.
Critical Path	Schedule	Actual																									
on-sky tests	9/30/2013																										
Milestone	Schedule	Actual																									
1																											
2																											
3																											
Risk	Mitigation																										
1 Horn design too costly. 2 CASPER development environment and ADCs unreliable	1 Exploring alternate horn design. 2 Switching to Natl. Inst. platform.																										

SCHEDULE: Delayed well into next fiscal year by horn and CASPER issues. Also, M. Morgan's time is becoming impacted by Bryerton's departure as well as new collaborative tasks with PAF.

RISK & MITIGATION: Original plan to build corrugated feedhorn increased from estimated \$5k to estimated \$20k. Now exploring alternative (simpler) horn designs.

POP MILESTONE #: 103
CDL – Next Generation Receivers
TITLE: Measure W-band LO distributor

 Cost
 Schedule
 Technical

COST:		TECHNICAL:	
Labor Actuals	Expected	Issue with amplifier oscillation that may be related to package design. Troubleshooting is underway, as is a new package layout.	
\$362,150	\$462,568		
Material Actuals	Expected		
\$66,734			
Travel Actuals	Expected		
\$2,453			
SCHEDULE:			RISK:
Critical Path	Schedule	Actual	Risk
measure LOD	9/30/2013		Top three risks
Milestone	Schedule	Actual	Mitigation
1			1 Oscillation issue may not be fixable in current package.
2			1 Designing new package layout.
3			

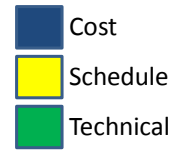
COST: The need for a re-build will increase the overall cost of this experiment on the order of \$5k.

SCHEDULE: The measurements have been delayed pending resolution of the oscillation problem. If stabilization is possible, preliminary measurements may be completed in the first quarter of 2014. Final measurements on re-built version would follow in the third quarter.

TECHNICAL: We are attempting to stabilize the amplifiers well enough to perform preliminary measurements, however, even if these measurements are successful we hope to repeat them later with a new "clean" build once all of the issues are understood.

RISK & MITIGATION: The risk is that the current oscillations may not be solvable in the existing package. Design of the new package is already underway to mitigate this, however it will not be finalized until all issues with the current version are understood.

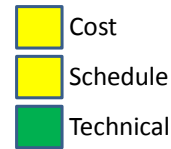
POP MILESTONE #: 106
CDL – Next Generation Receivers
TITLE: Develop 100-1000 GHz wideband
triple-ridged feed horn



COST:			TECHNICAL:	
Labor Actuals	Expected		Measurements of scale model delayed by NIST.	
\$362,150	\$462,568			
Material Actuals	Expected			
\$66,734				
Travel Actuals	Expected			
\$2,453				
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual	Risk	Mitigation
develop horn	9/30/2013		Top three risks	Could re-scale and re-build at 5-50 GHz (useful for our development, but unpublishable in itself.)
Milestone	Schedule	Actual	1 NIST fails to complete measurements.	
1				
2				
3				

SCHEDULE: Relying on NIST to perform measurements of the scale model using 1mm coax interface (a capability we don't have). NIST has been terribly unreliable. I have been in contact with them about this one measurement since September of 2012, and it is still not done. Measuring this scale model prototype is a necessary first step to developing the THz version.

POP MILESTONE # 120
ALMA Development
Title: Band 5 Local Oscillator



COST:			TECHNICAL:	
Labor Actuals	Expected		Multiplier technical specifications need to be drafted & signed. CDMR AIs pertaining to ICDs need to be completed.	
\$184.7 K	\$546.6 K			
Material Actuals	Expected			
\$269.2 K	\$1,315.7 K			
Travel Actuals	Expected			
\$5.05 K	\$21.1 K			
SCHEDULE:			RISK:	
Critical Path	Schedule	Actual/plan	Risk	Mitigation
Multiplier Order	8/30/13	11/15/13	1) Schedule delay due to extended delay in procurements from late CDMR, internal fiscal lockdown & federal furlough.	Interim block and multiplier orders placed but these will only meet critical requirements, not 2014 Q1 production schedule. Expect to catch up in 2014 Q2.
Milestone	Schedule	Actual		
B5 LO CDMR	3/29/13	9/25/13		

COST: FY2013 under-run will be carried over into FY2014. A request for two additional test sources has been factored into the revised baseline plan and SOW with little cost impact. Complete re-baseline with new cost recovery (30%, not included in original proposal) to completed in late Oct/early Nov (based on delay in CDMR and production orders).

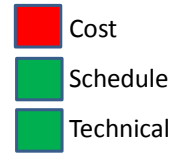
SCHEDULE: Since CDMR backed up to internal fiscal lockdown, and then Gov't furlough occurred, production orders have been delayed to the point where the mitigating interim orders will not bridge production schedule. Interim orders will fulfill all critical early articles for the Band 5 cold cartridge group to meet their 2014 Q1 delivery schedule. Furthermore, we are investigating parallel in-house micro assembly and smaller batches during early production.

TECHNICAL: Minor action items from CDMR to be completed.

RISK & MITIGATION:

- Schedule Delayed - For cold multipliers, the cold cartridge schedule (ESO/NOVA) risk was mitigated by placing an interim order to match early deliveries of CCAs. WCA delivery risk (due to late CDMR) was initially mitigated by interim AMC/PA orders which ensures early start of WCA production guaranteeing availability of WCA at the OSF when the CCAs arrive for integration into FE assembly.

POP MILESTONE #: 126
ALMA Development
TITLE: 2ND Generation Receiver for ALMA
Band 6



COST: \$1,891.90 over		TECHNICAL: Study Final report submitted.																
<table border="1"> <thead> <tr> <th>Labor Actuals</th> <th>Expected</th> </tr> </thead> <tbody> <tr> <td>\$85,936.90</td> <td>\$84,045.00</td> </tr> </tbody> </table>	Labor Actuals	Expected	\$85,936.90	\$84,045.00														
Labor Actuals	Expected																	
\$85,936.90	\$84,045.00																	
SCHEDULE:		RISK:																
<table border="1"> <thead> <tr> <th>Critical Path</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>Final Report</td> <td>9/30/2013</td> <td>9/30/2013</td> </tr> <tr> <td>Milestone</td> <td>Schedule</td> <td>Actual</td> </tr> <tr> <td>Optics Report</td> <td>9/30/2013</td> <td>9/30/2013</td> </tr> </tbody> </table>	Critical Path	Schedule	Actual	Final Report	9/30/2013	9/30/2013	Milestone	Schedule	Actual	Optics Report	9/30/2013	9/30/2013		<table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>Over Budget</td> <td>FY13 Cost overage will be covered by ALMA Ops Carryover account.</td> </tr> </tbody> </table>	Risk	Mitigation	Over Budget	FY13 Cost overage will be covered by ALMA Ops Carryover account.
Critical Path	Schedule	Actual																
Final Report	9/30/2013	9/30/2013																
Milestone	Schedule	Actual																
Optics Report	9/30/2013	9/30/2013																
Risk	Mitigation																	
Over Budget	FY13 Cost overage will be covered by ALMA Ops Carryover account.																	

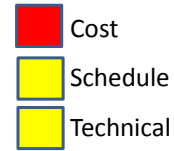
COST: Study overran total budget by \$1.892 K.

SCHEDULE: On Schedule. Final Report submitted.

TECHNICAL: None Study Final report submitted.

RISK & MITIGATION: FY13 Cost overage will be covered by ALMA Ops Carryover account.

POP MILESTONE #: I31, I34, I38
ALMA Development
Design Study for Production of Band 2



COST: \$8,733.55 over			TECHNICAL: OMT fabrication was a challenge. Fabrication was completed in Q4 FY13 however verification testing will be complete Q1 FY14. The Study final report was submitted without test results and will be amended in Q1 FY14.																							
<table border="1"> <thead> <tr> <th>Labor Actuals</th> <th>Expected</th> </tr> </thead> <tbody> <tr> <td>\$82,778.55</td> <td>\$74,045</td> </tr> </tbody> </table>			Labor Actuals	Expected	\$82,778.55	\$74,045																				
Labor Actuals	Expected																									
\$82,778.55	\$74,045																									
SCHEDULE: <table border="1"> <thead> <tr> <th>Critical Path</th> <th>Schedule</th> <th>Actual</th> </tr> </thead> <tbody> <tr> <td>OMT demo</td> <td>6/28/13</td> <td>Q1 FY14</td> </tr> <tr> <td>Optics Report</td> <td>9/30/2013</td> <td>Q1 FY14</td> </tr> <tr> <th>Milestone</th> <th>Schedule</th> <th>Actual</th> </tr> <tr> <td>1 OMT demo</td> <td>6/28/13</td> <td>Q1 FY14</td> </tr> <tr> <td>Optics Report</td> <td>9/30/2013</td> <td>Q1 FY14</td> </tr> </tbody> </table>			Critical Path	Schedule	Actual	OMT demo	6/28/13	Q1 FY14	Optics Report	9/30/2013	Q1 FY14	Milestone	Schedule	Actual	1 OMT demo	6/28/13	Q1 FY14	Optics Report	9/30/2013	Q1 FY14	RISK: <table border="1"> <thead> <tr> <th>Risk</th> <th>Mitigation</th> </tr> </thead> <tbody> <tr> <td>1 Late finish</td> <td>FY13 Cost overage will be covered by ALMA Ops Carryover account.</td> </tr> </tbody> </table>		Risk	Mitigation	1 Late finish	FY13 Cost overage will be covered by ALMA Ops Carryover account.
Critical Path	Schedule	Actual																								
OMT demo	6/28/13	Q1 FY14																								
Optics Report	9/30/2013	Q1 FY14																								
Milestone	Schedule	Actual																								
1 OMT demo	6/28/13	Q1 FY14																								
Optics Report	9/30/2013	Q1 FY14																								
Risk	Mitigation																									
1 Late finish	FY13 Cost overage will be covered by ALMA Ops Carryover account.																									

COST: Study under-running total budget by \$11.6 K (12%).

SCHEDULE: OMT demonstration incomplete (see technical note below).

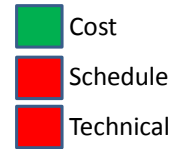
TECHNICAL: Machining of Orthogonal Mode Transducer (OMT) took longer than anticipated. Fabrication was completed in Q4 FY13 however verification testing will be complete Q1 FY14. The Study final report was submitted without test results and will be amended in Q1 FY14.

RISK & MITIGATION: FY13 Cost overage will be covered by ALMA Ops Carryover account.

POP MILESTONE #: 172

VLA Development

TITLE: Prototype low-band feed: CDR for new feed



COST:			TECHNICAL:		
Labor Actuals	Expected		Significant progress was made toward a design for a 74MHz dipole that will not cause blockage at other frequencies. However, technical issues with the integration of the feed on the antenna will require further work, and the CDR has been postponed indefinitely.		
<i>Labor budget held at a higher WBS level.</i>					
Material Actuals	Expected				
\$15.6k	\$26.3k				
<i>Remaining funds returned to NM Ops.</i>					
Travel Actuals	Expected				
<i>Travel budget held at a higher WBS level.</i>					
SCHEDULE:			RISK:		
Critical Path	Schedule	Actual	Risk	Mitigation	
Test Prototype Feed in Array	3/12/2013	1/31/2013 and 8/31/2013	No 74MHz observing system available for science.	Mount legacy Erickson dipoles in special 74MHz campaigns, as previously	
Design Selection	6/30/2013	8/31/2013			
Final design CDR	9/15/2013	Delayed			

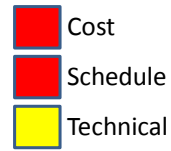
COST: The excess funds (~\$10k) were returned to NMOps.

SCHEDULE: The CDR for the Modified J-Pole (MJP) feed was scheduled for Q4, but has been postponed indefinitely. The prototype MJP worked very well but the mounting system was not robust enough to withstand the New Mexico climate.

TECHNICAL: The project developed a permanent 4-Band dipole feed system which could be used on the VLA. Two prototype Modified J-Pole systems were installed on the array and the test data indicates that: 1) the sensitivity is similar to the legacy Erickson dipoles; 2) the bandwidth is wider than the legacy system; 3) the blockage at HF is less than 1.5%. EVLA memos 172 through 175 describe the performance of the system in more detail. However, there were mechanical problems that led to a delay and eventual cancellation of the CDR for the Modified J-Pole (MJP) feed. The testing identified four deficiencies that must be addressed before testing can resume: 1) The Modified J-Pole feed and the mounting scheme needs to be redesigned to withstand the New Mexico climate; 2) The new low band receiver needs to include 4-Band surge protection; 3) Self-generated RFI in the pass-band of the Modified J-Pole system needs to be reduced; 4) A follow-on project needs to be approved and funded before work resumes.

RISK & MITIGATION: The mitigation of the risk associated with not having a new 74MHz system is to continue to use the 74MHz dipole feeds in campaign mode, as has been done in the past. There are currently no proposals in I3B or I4A that are requesting to use the 74 MHz system. If new proposals come in, we will have to do some additional testing of the Erickson dipoles, which have not yet been used with the new low-frequency receivers.

POP Milestone #: I77, I78
GBT Development
TITLE: VEGAS



COST:		TECHNICAL:		
Labor Actuals	Expected	<ul style="list-style-type: none"> • Testing on Modes 1-3 is complete • Testing Mode #4 now with some issues 		
\$232k	\$220			
Materials Actuals				
\$1.7k	\$0k			
Travel Actuals	Expected			
\$0	\$0			
SCHEDULE:		RISK:		
Critical Path	Schedule	Actual	Risk	Mitigation
All Modes on GBT	Q4 FY13	Q2 FY14 (est)	1 Delayed testing of remaining modes	Added testing scientists and tiered testing
Milestone	Schedule	Actual	2. NRAO resource availability	None; Key resource is shared with other projects
1. W/B Mode	Q1 FY13	Q2 FY13		
2. All modes	Q4 FY13	Q2 FY14 (est)		
3. Data Streaming	Q4 FY13	Complete		

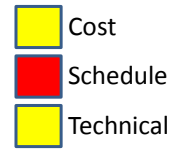
COST: The costs are running higher than budget as of June mainly due to the earlier ROACH-2 integration issues. Additionally the issues found during a WFO project using VEGAS modes that were legitimately VEGAS have been re-allocated to VEGAS, expanding the funding deficit.

SCHEDULE: The sub-award final report with UC-B has been filed and accepted closing the sub-award. The schedule continues to be challenged by more test/fix/retest iterations on the individual modes than were scheduled.

TECHNICAL: No significant technical issues remain, but the number of smaller issues with each mode remains higher than anticipated.

RISK & MITIGATION: The Key Project Risk is now completion of testing. As part of the SHAO Backend Recovery Plan, additional resources were added to the test team and a two-tiered test plan adopted. The UC-B team has stepped up to a higher-level of issue response and support. The pace is limited by resource availability. Operations has agreed to not dilute the testing resources with observer support responsibilities by delaying shared risk use of VEGAS until all primary modes are commissioned.

POP Milestone #: 183, 184, 185, 186
GBT Development
TITLE: MUSTANG 1.5



COST:		TECHNICAL:		
Labor Actuals	Expected	There are not currently any NRAO technical issues, but the project is being hampered by the delay in detector deliveries from NIST.		
\$352k	\$314k			
Materials Actuals				
\$16.6k	\$37k			
Travel Actuals	Expected			
\$0.3k	\$5k			
SCHEDULE:		RISK:		
Critical Path	Schedule	Actual	Risk	Mitigation
Rcv. Detectors	Q2 FY13	TBD	1. Delayed HF Obs.	1 Use MUSTANG 1.0
Milestone	Schedule	Actual	2 Delayed release of team	2. Consider hiatus
1 Rcv Detectors	Q2 FY13	TBD		
2 HEMT Amps	Q3 FY13	Q1 FY14		
3 Init. Software	Q4 FY13	Q1 FY14		




COST: The costs of machine shop fabrications has increased due to a non-specificity of what would be NRAO fabricated v. UPenn fabricated assemblies beyond the cryogenics. Due to a lack of knowledge by the external collaborators, NRAO was required to absorb the firmware development in addition to the agreed upon interface and instrument M&C software.

SCHEDULE: The schedule is driven by receipt of the detectors which are being donated by NIST and the leverage available to the PI (UPenn) is therefore limited.

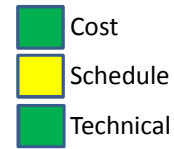
TECHNICAL: There are currently no technical issues out of tolerance for the NRAO portions of the project.

RISK & MITIGATION: The improved observation capabilities of MUSTANG 1.5 are being delayed by detector delivery and the current MUSTANG 1.0 on the GBT will be required to support the upcoming high-frequency (HF) season. NRAO is developing a hiatus plan for our project staff based on a well - defined stopping point until which time the detectors arrive at UPenn

POP MILESTONE #: I90
Administration: ES&S
TITLE: Program established to reduce energy usage 5%

-  Cost
-  Schedule
-  Technical

COST:			TECHNICAL: Only notable or current items If Technical stoplight is yellow or red, add issue description here	
SCHEDULE:			RISK:	
Milestone	Schedule	Actual	Risk	Mitigation
1 Completion of NSF sponsored energy review	Aug 2013	Unknown – NSF report not received	Top three risks	
2 Re-lamp ER HQ and hallway motion sensors	Jun 2013	Aug 2013	1	
3 Consider photo-voltaic energy at VLA. Deemed not cost effective.	Mar 2013	Jul 2013	2	
			3	

POP MILESTONE #: 212**CIS: Information Infrastructure****TITLE: Release of an integrated room and resource reservation system****COST: Deferred to FY14**

Labor Actuals	Expected
\$2k	\$2k
Material Actuals	Expected
\$20k	\$20k
Travel Actuals	Expected

TECHNICAL: No issues**SCHEDULE:**

Milestone	Schedule	Actual
1 Product evaluation	3/2013	3/2013
2 Replacement selection	5/2013	4/2013
3 Purchase of S/W	6/2013	11/2013
4 Integration testing	7/2013	12/2013
5 Production release	9/2013	1/2014

RISK:

Risk	Mitigation
Top risk	
1 Current solution date limit is December 2015	Execute transition in FY14
2 CIS Funding pressure	Prioritize replacement

COST: Replacement software cost was deferred to FY14.

SCHEDULE: Delayed until FY14.

RISK & MITIGATION: Current legacy room reservation system (WebEvent) continues to function: Date limit of December 2015.

QSU #4 Exceptions



July 1 – September 30, 2013, FY2013



Atacama Large Millimeter/submillimeter Array
Karl G. Jansky Very Large Array
Robert C. Byrd Green Bank Telescope
Very Long Baseline Array



Exception Title: VLA Maintenance Plans Replace Antenna 21 Azimuth Bearing

- Azimuth bearing not replaced in FY13 due to:
 - Manpower shortage (loss of one FTE) in antenna mechanics group, 1/1/2013
 - Conflict with completing the installation of the prototype ACU
 - Need to replace rail at FD VLBA site



Limited manpower resulted in the need to prioritize the replacement of rail at the Fort Davis VLBA site, installing the new Antenna Control Unit on antenna 21, or replacing the azimuth bearing on antenna 21. The FD and ACU needs were prioritized above the azimuth bearing replacement.

Exception Title: VLA Maintenance Plans Replace 3500 railroad ties and one intersection

- The track crew installed 2000 ties and one intersection.
Track crew were called on to perform other work:
 - Lining and leveling of 26 miles of track
 - Modification of cold storage building
 - Concrete work for Bracewell Sundial project



The track crew installed 2000 ties and one intersection. The reasons the original goals were not met were due to unexpected work, which they were called upon to perform. This includes the lining and leveling of 26 miles of track, which required the installation of 19000 tons of ballast. When leftover EVLA funds became available, these had to be spent in FY13 and the track crew suddenly became responsible for the modification of the EVLA cold storage building into the new home of the Track and HVAC crews. This required 3 months of their time. Another unexpected yet significant task the crew underwent was the preparation and installation of the concrete portions of the Bracewell Sundial project.

Exception Title: Diversity Review Panel

- The panel consisted of seven distinguished diversity professionals invited by Tony Beasley to review NRAO's diversity program and provide recommendations that can improve our program.
- The review was conducted on June 25 and 26 in Charlottesville, VA
- The Diversity Review Panel Members included:
 - Dr. Hector Arce, Astronomy Department, Yale University
 - Sheryl Bruff, HR Branch Chief – Space Telescope Science Institute
 - Dr. Dara Norman, Assistant Scientist – National Optical Astronomy Observatory
 - Dr. Lawrence Norris, National Society of Black Physicists
 - Dr. Ashanti Johnson, Executive Director of the Institute of Broadening Participation and Faculty Research Associate, University of Texas at Arlington
 - Dr. Charles Liu, Professor of Astrophysics, City University of New York
 - Darlene Scott-Scurry, Director of Equal Opportunity Programs, University of Virginia
- The final report was received by NRAO on August 27.



Exception Title: EPO – STEM Education

- Multiple groups visited VLA for educational tours
- New VLA “Radio Sundial” inaugurated; signage and educational brochure produced
- Several other NM outreach activities
- Multiple groups visited GB for overnight educational research using 40 Foot Telescope
- Multiple Educational Multi-Day Events in GB
- Multiple WV Outreach events (not at NRAO GB facility)
- GB 20 Meter “Skynet” remotely controlled educational telescope had L-Band receiver installed, enabling HI spectroscopy



VLA Group Visits: NM Tech Summer Science Program, 48 students; Chautauqua Short Course, 9 attendees; NM Architects, 12; CV REU Students, 13; La Luz Teacher Academy, 12; Senator Henrick and staff (3); International Visitors Dr. Tariqui, (5); NM Tech Parent's tour, 34; NM State Tourism Board, 15; Rotary Club International students, 21; Alamo Navajo Reservation, 15; IUA tour, 56 plus 14 staff

NRAO REU Student-Led Tours: July 13: 2 tours, 28 visitors; July 20: 2 tours, 18 visitors

VLA First Saturday (of the month) Tours: July count: 202 (2012 count: 78); August count: 160 (2102 count: 97); Sept. count 122 (2012 count: 43)

Other VLA Education/Outreach Activities: Sundial construction assistance and pier painting; Parkview ES Career Fair; MRO Perseid Meteor shower event; Sundial Grand Opening

GB Overnight Groups/40 Foot Telescope Research: Mtn. Vista Governor's School (VA); Boy Scout Troop 25 (VA); Boy Scout Troop 1352 (VA); Roanoke Valley Astronomical Club (VA); Almost Heaven Star Party (DC area); Boy Scout Troop 225 (WV); NYSC Directed Study; Einstein Fellows (NSF, NASA teachers)

GB Educational Multi-Day Events: Week-long Pulsar Search Collaboratory Teacher and Students Leader Institutes (18 students, 2 Teacher mentors, 2 graduate students and 6 undergraduate students also participated); 2 week-long WV Governor's School for Math and Science (60 rising 9th graders from WV). Week-long Educational Research in Radio Astronomy workshop (annual UNC-led camp); StarQuest multi-day star party; Annual Society of Amateur Radio Astronomy conference

WV Outreach Events (not at NRAO GB facility): Annual National youth Science Camp Tour; Annual Family Science Day Open House (360 guests); Train Ride Star Parties with NRAO staff (2) (135, 108 guests); Pocahontas County Memorial Youth Health Fair; Durbin Days Parade (use of NRAO bus); Family Science Lab in July

Exception Title: EPO – Press/Media Activity

- Issued ten press releases and three media announcements
- Upgraded NRAO press release distribution capability
- Multiple media visits to Green Bank
- Multiple media visits to ALMA
- Arranged for media pass for Seth Fletcher of Scientific American to the NRAO-sponsored Galactic Center colloquium (IAU 303) in Santa Fe
- Fact-checked VLA article for NM Magazine.
- Arranged for reporter/photog visit to North Liberty VLBA site for Iowa Gazette newspaper and KCRG-TV



Press Releases: Newly Found Pulsar Helps Astronomers Explore Milky Way's Mysterious Core; Snow Falling Around Infant Solar System; Starburst to Star Bust; NRAO Telescope Reborn as Earth-based Antenna for RadioAstron Satellite; Starbirth Surprisingly Energetic; Gas Cloud Causes Multiple Images of Distant Quasar; ALMA Opens Another Window on the Universe with Band 8 Receivers; Powerful Jets Blowing Material Out of Galaxy; Voyager 1 Spotted from Earth with VLBA and GBT Telescopes; 'Jekyll and Hyde' Star Morphs from Radio to X-ray Pulsar and Back Again

Media Announcements: AUI and WVU Sign \$1 Million Agreement with NRAO; Astrophysicist Charles Bennett Receives 2013 Jansky Lectureship Award; Final Antenna Delivered to ALMA

Upgraded press release distribution capability: EPO has subscribed a full-service media support service which expands our linkages to the national and international news media. This enhances our capabilities in media monitoring, media list development, and press release dissemination. It thoroughly tracks press mentions (electronically and in print) of NRAO and its telescopes. It allows NRAO to create media lists tailored to specific topics, such as engineering, associations and non-profits, technology, education, and entertainment. (This was used to great effect when announcing the new Visitors Center video for the VLA.) It also gives NRAO the ability to prepare news releases in advance and distribute them directly to reporters. To leverage these new capabilities, NRAO now has a dedicated list of more than 300 science reporters.

Multiple media visits to GB: (1) October [postponed]: Yahoo News is preparing a feature on Green Bank; the Government shutdown in October pushed the filming back to November. Essential groundwork for the visit was made in September and October; (2) September 11: The Japanese Documentary "Cosmic Front," led by reporter Tomoko Kawasumi, filmed a documentary on the history of Green Bank, the GBT, and the SETI work that was done there; (3) July 24: Reporter George Musser from Scientific American visited Green Bank as background for a feature story on the GBT; (4) July – October: A production team working for the West Virginia Department of Tourism visited and continues to request information and images about Green Bank for a new documentary and tourism

video; (5) July 5: Aljazeera TV with producer Mahmoud El Hamalawy filmed at Green Bank to produce a video on the GBT and Quite Zone, which was broadcast on Aljazeera TV USA.

Multiple media visits to ALMA: (1) September 2-8: Part2Pictures, the Oprah Winfrey production company planned a major documentary on ALMA. This involved @25 hours of staff time in preparation. [Canceled due to strike at ALMA]; (2) September 24-26: WNET, the PBS station in New York City, planned a feature story on the building of ALMA and the work already underway at the observatory. [Canceled due to strike at ALMA]

Press Conferences: Featured NRAO users discussing GBT observations of Milky Way and VLBA NGC 660 observations

Exception Title: EPO – Social Media & Web

- Facebook followers grew from 14,766 to 22,537 during Q4
- Twitter followers grew from 3,990 to 4,397 during Q4
- New public web site <https://public.nrao.edu> up and running
 - Includes new gallery of 700 unique media elements
 - Includes new GB virtual tour featuring 70 “tour stops” and staff interviews



Exception Title: EPO – Visitor/Science Centers

- VLA public visitation counted: 4,370 during period
- GB public visitation counted: 18,299 during period
- Several community group events hosted in GB
 - Pocahontas County Herb Fair
 - Farmers Market
 - Garth Newell Concert (public event)
 - Movie Premier for public – showing of Angel's Perch
- VLA Visitor Center entrance now has improved highway signs along US Highway 60, courtesy of NM Department of Transportation.



QSU# 4 2013 - Financials



Atacama Large Millimeter/submillimeter Array
Karl G. Jansky Very Large Array
Robert C. Byrd Green Bank Telescope
Very Long Baseline Array



Q4 FY13 Final Summary

- Overall Issues
 - Benefits – budgeted at 35%, final rate was 37.5%
 - Impact of HDHP was less than anticipated.
 - Regular benefits true-ups impacted all operations.
 - Budget adjustments made and accounted for a \$1M overrun.
- NRAO Ops
 - Growing WFO & research activity providing CCR revenue assistance and salary support.
 - Accommodated budget error & benefits overruns through combination of revenue opportunities, elimination of infrastructure investments and capture of open positions.
 - Overall, managed to a balanced budget meeting planned carry-over needs: GBT structural inspection pool; GB track funds contribution.



FY13 YTD by Major WBS Category ALMA Ops – Q4

	FY13 POP Budget	FY13 YTD Expenses	YTD %
Telescope Ops	20,263	22,811	112.6
Development	2,992	4,497	150.3
Science Ops	5,363	5,843	109.0
Admin Services	5,045	4,256	84.4
Director's Office	2,291	2,189	95.5
Total	35,954	39,595	110.1

- Telescope Ops includes power installment payment to ESO (not part of POP.) Many open PO's for long lead spares & for year long services.
- Development reflects open commitments, planned fiber-optic infrastructure project in Chile, as well as expenditures of FY12 development funds rolled into FY13.
- Apparent budget overrun covered by approved carryover.



ALMA Development is working as a cumulative pool, including funds as they are awarded and reporting on them as they are expensed – a process which may span multiple fiscal years. One aspect of this line is the delayed purchase of the Band 5 LO equipment – totaling \$1.5M. The FY13 budget noted only the FY13 development pool. Future POPs will reflect expected in-year expenditures.

Telescope Ops open commits includes the catering/cleaning contract which ends up being split amongst the partners.

FY13 YTD by Major WBS Category NRAO Ops – Q4

	FY13 POP Budget	FY13 YTD Expenses	YTD %
Telescope Ops	16,793	16,127	96.0
Development	4,056	3,882	95.7
Science Ops	6,414	7,166	111.7
Admin Services	13,944	12,739	91.4
Director's Office	4,545	4,426	97.4
Total	45,752	44,340	96.9

- All groups impacted by mid-year budget reductions and benefits overruns.
- Shift in expenses coded to science operations vs. budgeted to telescope ops in GB.
- Admin services – benefits expenses running high; better than expected cost recoveries.
- Prior year commitments are shown as expenses; open commitments are not.

