Title: QSU 2 FY13	***Author:*** LM Wingate	***Date:*** 05/09/2013
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National Radio Astronomy Observatory
Quarterly Status Update 2 FY13

January – March 2013

PREPARED BY	**ORGANIZATION**	**DATE**
LM Wingate	PMD	05/09/2013

APPROVALS (Name and Signature)	**ORGANIZATION**	**DATE**
T Beasley	NRAO	05/09/2013

NRAO Quarterly Status Update 2 FY 2013
January 1 - March 31, 2013
05/03/2013

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

POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment COST	Q1 SCHEDULE	Q1 TECHNICAL	Q2 Performance Assessment COST	Q2 SCHEDULE	Q2 TECHNICAL
	NRAO All Funding							
	Observatory Science Operations							
	Observatory Time Allocation							
1	PST will be updated to support the observing modes for 2 Calls for Propsoals (for 2013B and 2014A)	3/29/2013						
		9/30/2013						
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	3/29/2013						
		9/30/2013						
	Scientific User Services							
	Helpdesk/User Forums							
4	Upgrade to ensure transfer of tickets and knowledgebase articles from Kayako v3.0 into Kayako v4.0 complete	12/31/2012						
5	Dedicated pipeline department setup in NRAO helpdesk system and new Kayako v4.0 deployed to international ALMA community	3/29/2013						
	User Documentation							
6	Update of 'casaguides' for 6th CASA Release	12/31/2012						
7	All relevant OPT documentation converted to PLONE	3/29/2013						
	Data Processing							
10	Automated calibration of standard VLA observations completed	12/31/2012						
11	Access by external user for initial version of VLA pipeline reprocessing	3/29/2013						
	Science Software Development (CASA)							
15	CASA upgrade 4.0: migration of Python Binding infrastructure, support for ALMA and EVLA Low Frequency Polarization, focus on system performance and parallelization	12/31/2012						
	ObsPrep Software							
18	OPT release will include capabilities, resource set-ups, and documentation ready for VLA Full Science Operations	12/31/2012						
	Data Access Software							
20	ASA query and retrieval tool deployed	3/29/2013						
	Applications Software: Splatalogue							
21	New line lists sent to the ALMA OT and CASA	3/29/2013						
	Software Research & Development							
24	Resolve the outstanding numerical issues in the combined MS-MFS and Wide-band A-Projection algorithm	12/31/2012						
	Data Management (See CIS)							
	Observatory Telescope Operations							
	ALMA Construction							
27	Complete AAER	12/31/2012						
28	Complete AOS power and fiber optic connections to antenna stations	12/31/2012						
29	Deliver nutator unit 1	12/31/2012						
30	Deliver nutator units 2-5	3/29/2013						
31	Complete OPT acceptances	12/31/2012						
32	Deliver Band 10 WCAs to OSF	12/31/2012						
33	Deliver Band 10 WCAs to OSF	3/29/2013						
34	Deliver FE test set	12/31/2012						
35	Deliver FEHV unit 1 to OSF	12/31/2012						
36	Deliver FEHV units 2-4 to OSF	3/29/2013						
37	Deliver BE AA Test Stand	12/31/2012						
	EVLA Construction							
38	All hardware delivered and under NM Ops purview	12/31/2012						
39	All construction equipment and space transferred to NM Ops	12/31/2012						
40	Risk Plan closed out	12/31/2012						
41	All WBS project accounts closed	3/29/2013						
46	Final cryogenic system installed on antennas	12/31/2012						
47	Final X-Band receiver installed on antennas	12/31/2012						
48	Final Ku-Band receiver installed on antennas	12/31/2012						
49	Computing hardware purchased	12/31/2012						
	VLA Commissioning and Support							
50	Support semester 2012B Early Science observing	12/31/2012						
51	Complete commissioning of capabilities offered for 2013A	12/31/2012						
52	Begin full operations (capabilities offered for FY 2012 Q4 CfP)	3/29/2013						
53	Define and document capabilities for semester 2013B CfP	12/31/2012						
54	Support semester 2013B CfP	3/29/2013						
	VLA Modifications/Upgrade Projects							
	VLA Prototype Replacement ACU Milestones							
59	Critical Design Review prior to installation in antenna	3/29/2013						
60	Install hardware system into a lab prototype	3/29/2013						
61	Integrate full software system	3/29/2013						
	VLBA Infrastructure Modifications/Upgrade Projects							
64	Narrow-bandwidth modes verified	12/31/2012						
65	Transition of legacy proposals to DDC completed	3/29/2013						
66	Second RDBE & network switch installed at all stations	3/29/2013						
67	Scientific VLBI observations started in a subset of modes	3/29/2013						

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POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment		
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL
	GBT Modifications/Upgrades Projects							
	Digital Servo Replacement							
68	Control kernel delivered into integration test lab	12/31/2012						
	Multi-color Tipper							
72	Complete mitigation efforts	3/29/2013						
	GBT Sub-reflector Actuator Replacement							
75	Actuator replacements complete	3/29/2013						
76	Updated focus tracking model	3/29/2013						
	20m Telescope Modification/Upgrade Projects							
	RadioSkyNet							
77	L-Band receiver installed on 20m	12/31/2012						
78	Telescope refurbishment complete	12/31/2012						
79	Skynet science reaches 'operational phase'	3/29/2013						
	Observatory Development Programs							
	Central Development Laboratory							
	Low Noise Amplifiers							
80	Test 68-90 GHz LNA using cryo3 devices	12/31/2012						
81	Test 33-50 GHz LNA using cryo3 devices	3/29/2013						
	Millimeter/Sub-Millimeter Detectors							
86	Measure 375-500 GHz balanced mixer	12/31/2012						
87	Measure band 6 balanced mixer (Nb/AlOx/Nb junction)	3/29/2013						
	Optics and Electromagnetic Components							
90	Test 33-50 GHz turnstile junction OMT	12/31/2012						
91	Test 67-90 GHz turnstile junction OMT	3/29/2013						
	Phased Array Feeds							
94	Fiber installations complete	12/31/2012						
95	Control software complete	3/29/2013						
98	Fabrication of lower-noise LNAs complete	3/29/2013						
	Next Generation Receivers							
104	Measure flexible thermal transition	3/29/2013						
	PAPER/HERA							
107	Ship first 25 elements of upgrade	12/31/2012						
108	Ship second 25 elements of upgrade	3/29/2013						
	DARE							
112	Develop calibration technique using temperature dependent models of the front-end	3/29/2013						
	ALMA Development							
	Band 5 Local Oscillator							
114	"Kick-off" meeting	12/31/2012						
115	Band 5 pre-production LO built & test complete	12/31/2012						
116	Frequency doublers procurement and test complete	12/31/2012						
117	Integration and test with Band 5 cold cartridge complete	12/31/2012						
118	Band 5 LO Critical Design & Manufacturing Readiness Review	3/29/2013						
	2nd Generation Receiver for ALMA Band 6							
121	"Kick-off" meeting	12/31/2012						
	Design Study for Production of Band 2 Cartridges							
127	"Kick-off" meeting	12/31/2012						
128	Draft specifications & ICD	12/31/2012						
129	MMIC LNA delivered to ARO	12/31/2012						
130	MIC LNA delivered to ARO	12/31/2012						
132	Modifications to 12m receiver inserts complete	6/28/2013						
	mm/submm VLBI with ALMA							
139	"Kick-off" meeting	3/29/2013						
	Ultra-Wideband Quantum Limited Amplifiers							
147	"Kick-off" meeting	12/31/2012						
148	Intermediate performance review	3/29/2013						
	Unleashing Large Dataset Science							
151	"Kick-off" meeting	12/31/2012						
152	Intermediate performance review	3/29/2013						
	A Visualization Portal for ALMA Data							
155	"Kick-off" meeting	3/29/2013						
	ALMA Band 1 Receiver Development Study							
159	Science & functional requirements definition	3/29/2013						
	VLA Development							
	VLA Low-Frequency Receivers							
165	First observations using 16 receivers with low-band	12/31/2012						
166	18 functional receivers installed	3/29/2013						
	Prototype Low-Band Feed Development							
169	Finish building and testing new designs	3/29/2013						
	VLBA Development							
	VLBA Synthesizer Development							
173	CDR	3/29/2013						

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POP Milestone	TASK NAME	QUARTERLY DEADLINE	Q1 Performance Assessment			Q2 Performance Assessment		
			COST	SCHEDULE	TECHNICAL	COST	SCHEDULE	TECHNICAL
	GBT Development							
	VEGAS Development							
176	Wideband spectrometer mode successfully tested on GBT	12/31/2012						
	ARGUS (GBT 4x4 Comet Camera)							
179	Focal plane and cryostat Critical Design Review	12/31/2012						
	GBT MUSTANG1.5							
181	Cryogenic parts delivered	12/31/2012						
182	Initial cool down	12/31/2012						
183	Detectors received from NIST	3/29/2013						
	Observatory Administrative Services							
	Business Services							
191	All business units aligned with the WBS in JD Edwards	12/31/2012						
192	FY2014 Budget process and materials consistent with POP presentation	3/29/2013						
	MIS							
195	Implementation to Chart of Accounts complete	9/30/2013						
	CAP							
197	Export Compliance Program implemented across NRAO	12/31/2012						
	Human Resources							
	Compensation							
198	An assessment of NRAO's management structure complete.	12/31/2012						
199	Updated job descriptions for all NRAO jobs available	3/29/2013						
200	An electronic Performance Evaluation Process implemented	3/29/2013						
	Benefits							
201	Implementation of the revised HSA/HDHP Plan complete	12/31/2012						
	Employee Relations							
202	Complete an assessment of NRAO's Ombudsman Program	12/31/2012						
	CIS							
	CCE							
204	Power and carbon footprint review for Computing resources.	12/31/2012						
205	Completion of major OS upgrades.	3/29/2013						
206	Install 12 Archive (NM)+ 12 mirror (CV) storage nodes for VLA support	3/29/2013						
	Data Management							
208	Implementation of ALMA Science Archive access from the NAASC Web Portal	12/31/2012						
209	Automation of ALMA QA level 2 product delivery from NAASC to JAO and other ARCs	3/29/2013						
	Information Infrastructure							
211	Web-based user interface for CASA pipeline tasks	12/31/2012						
	Networking and Telecom							
213	Installation of a secure 10Gigabit/s Internet link for the GB site	12/31/2012						
214	Upgrade of the Chilean link to SCO	3/29/2013						

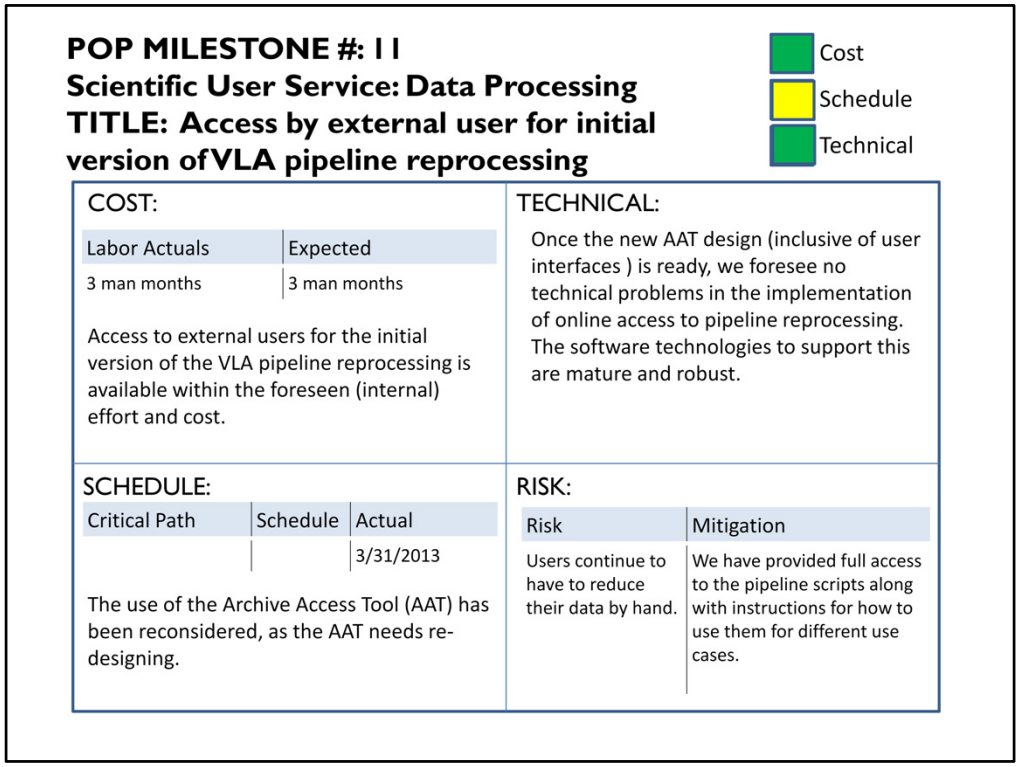
Quarterly Status Update (QSU 2 2013)

January 1 – March 31, 2013

Associated Universities, Inc.

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

NRAO



Provide details on each of the square below. This should be further information that may be useful at time of presentation or if questions are asked.

COST: Access to external users for the initial version of the VLA pipeline reprocessing is available within the foreseen effort and cost.

SCHEDULE: The original idea to utilize the Archive Access Tool (AAT) for pipeline reprocessing has been reconsidered, based on the outcome of an AAT review. This lead to a substantial AAT redesign that has been started, along with a design for user online access to pipeline reprocessing, which might combine them or not. Access by external users to VLA pipeline reprocessing is granted. The implementation schedule for the new AAT and user interfaces will follow and will be tracked separately in the FY14 plans.

TECHNICAL: Once the new AAT design (inclusive of user interfaces) is ready, we foresee no technical problems in the implementation of online access to pipeline reprocessing. The software technologies to support this are mature and robust.

RISK & MITIGATION: The risk associated with the schedule delay is low. The primary impact is that users may have to reduce their data by hand, delaying the time to publication. To mitigate this risk we have made the pipeline scripts available for download so that users can run them at their home institution, along with instructions for how to use the scripts for various use cases, at https://science.nrao.edu/facilities/vla/data-processing/pipeline.

POP MILESTONE #: 28
ALMA Construction
TITLE: Complete AOS power and fiber optic connections to antenna stations

Cost
Schedule
Technical

COST:

Actuals	Expected
$45,178 k	$48,820 k [1]

1 - Expected Cost (Budget at Completion) includes Budget Change Requests for $1,200k total

TECHNICAL:

Code compliance of the 3-conductor power distribution grid is being reviewed.

SCHEDULE:

Milestone	Schedule	Actual
1 Complete AOS Utilities contract	30/04/13	30/06/13
2 Complete AOS fuse disconnectors	30/10/13	30/10/13

RISK & MITIGATION:

Risk	Mitigation
Possible delay of CSV and Early Science until code compliance is verified	Hire independent consultant

COST: New BCRs are in the approval process to cover the cost to complete activities for the AOS Utilities work. Procurement process for AOS Extended Array power disconnectors completed in Q2; use of contingency is required to complete the installation. Contract is written in two stages: stage 1 will proceed and stage 2 will be an option only if funds are available. Construction will proceed in Q3, Q4 FY 2013 and Q1 FY2014 (October 2013).

SCHEDULE: The Contractor is behind schedule in finishing the work, but is on track to finish at the end of Q3 FY13. The procurement process to issue work on the Extended Array power disconnectors is complete and approval has been received. Their construction will proceed in until Q1 2014. At this time, there is no critical implication on the ALMA schedule and no risk for the Early Science program due to this work.

TECHNICAL: The low voltage (400V) cables between transformers and antenna stations for a number of locations within the inner array have not been installed in accordance with the design. The proposed fix is a quick and inexpensive revision to the cable grounding scheme that makes the installation code-compliant and will allow CSV testing and science to proceed. An independent consultant will be used to determine code compliance.

RISK & MITIGATION: A Consultant will be approached to determine code compliance to not delay CSV and Early Science schedules.

POP MILESTONE #: 29
ALMA Construction
TITLE: Deliver nutator unit 1

Cost
Schedule
Technical

COST:

Actuals	Expected
$1,915k	$2,030k

TECHNICAL:

- Nutator Unit #1 site acceptance testing confirmed factory acceptance performance
- CRE submitted and accepted to allow performance requirements as a function of commanded position angle and nutating frequency

SCHEDULE:

Milestone	Schedule	Actual
1 JAO acceptance of Nutator #1	09/04/13	24/05/13

RISK & MITIGATION:

Risk	Mitigation
1 Additional schedule delay	Resolve ACRV "Blocker" action items as quickly as possible

COST: Cost for Nutator delivery is on track.

SCHEDULE: Unit #1 Site Acceptance Testing completed on 2 Feb 2013. Unit #1 ACRV conducted on 9 Apr 2013; acceptance by ALMA JAO pending resolution of "Blocker" action items

RISK & MITIGATION: Resolving ACRV "Blocker" action items as quickly as possible to allow "Conditional Acceptance." The blockers identified at ACRV are performance of the insulation and grounding test and resolving items in the nutator/computing interface control document.

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

Cost
Schedule
Technical

COST:

Actuals	Expected
$1,915k	$2,030k

TECHNICAL:

- Slight chance that pointing performance of units #2 - #5 won't meet requirements
- CRE submitted and accepted to allow performance requirements as a function of commanded position angle and nutating frequency

SCHEDULE:

Milestone	Schedule	Actual
1 JAO acceptance of Nutator #2	28/02/13	14/06/13
1 JAO acceptance of Nutator #3	28/02/13	14/06/13
1 JAO acceptance of Nutator #4-5	29/03/13	26/07/13

RISK & MITIGATION:

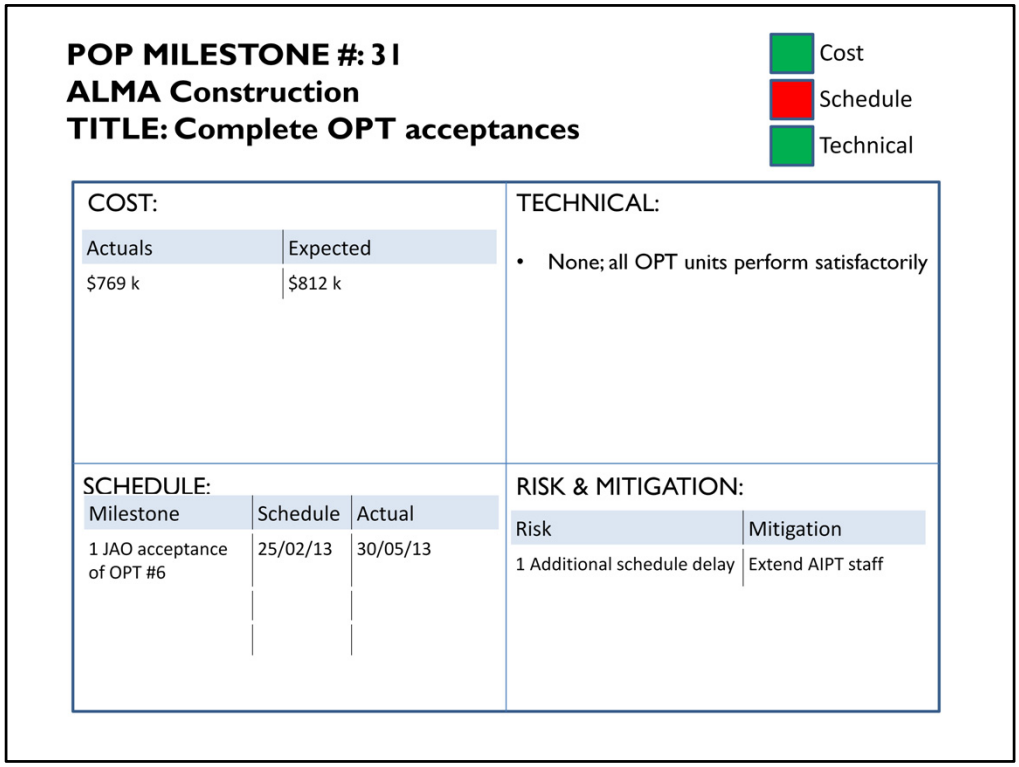
Risk	Mitigation
1 Additional schedule delay	Maintain close scrutiny of contractor

COST: Cost for Nutator delivery is on track.

SCHEDULE: Factory Acceptance Testing (FAT) for Unit #2 & #3 to be conducted 4-11 May 2013; tentative Site Acceptance Testing (SAT) in early-June 2013. Units #2 & #3 FAT tentatively late-June 2013; SAT tentatively late-July.

TECHNICAL: Units 2-5 built identically to unit 1, which complies with specification as modified by CRE.

RISK & MITIGATION: To minimize the risk of additional schedule delays, ASIAA and NAAIPT Lead Engineers will be on-site along with NRAO Control System Engineer for FATs. To monitor Contractor status, weekly teleconferences continue.



COST: Cost for OPT acceptances is on track.

SCHEDULE: Acceptance Testing of Unit #6 delayed by test Antenna availability and bad (cloudy) weather. Site Acceptance of Unit #6 completed on 04 Apr 2013. All tests complete. ACRVs planned for May 2013.

RISK & MITIGATION: On-site NA AIPT engineering support extended until early April 2013 to conduct site acceptance testing

POP MILESTONE #: 33
ALMA Construction
TITLE: Deliver Band 10 WCAs to OSF

Cost
Schedule
Technical

COST:

Actuals	Expected
$6,119k	$6,291k

TECHNICAL:

SCHEDULE:

Milestone	Schedule	Actual
Ship final WCA to OSF	03/31/13	06/17/13

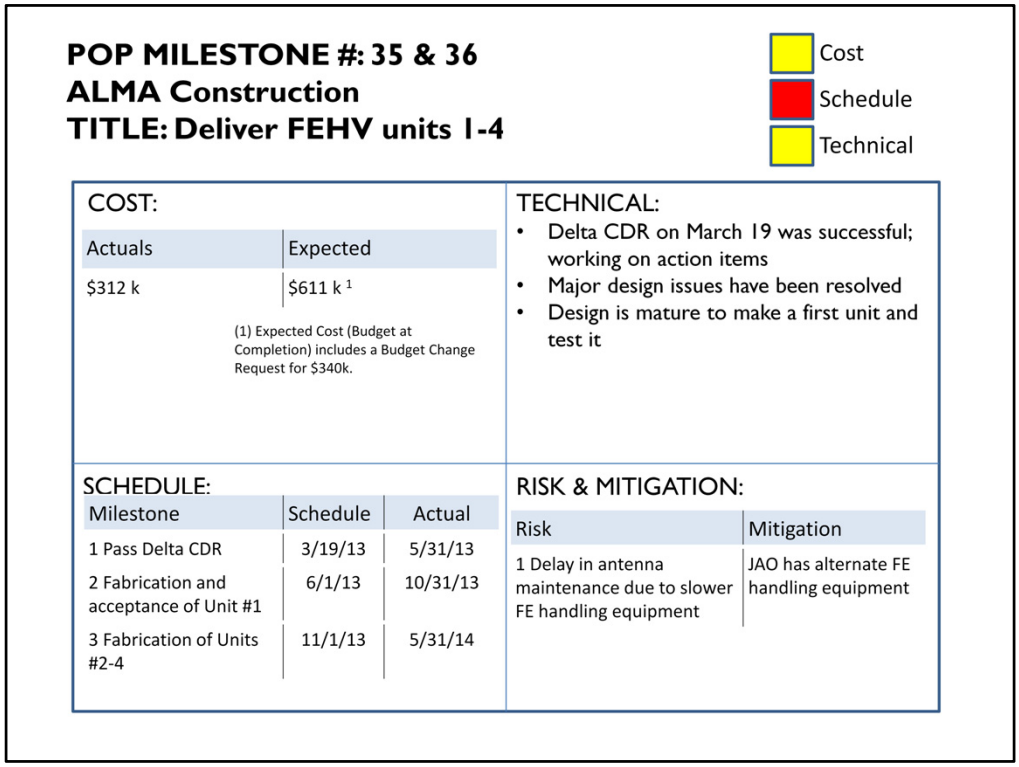
RISK:

Risk	Mitigation
Submodule (AMC) qualification rework delayed	None

COST: Projected cost-to-complete is $6,210K, below the total budgeted cost of $6,291K.

SCHEDULE: 90-day extension to SOW was granted for completion of band 10 WCA production, with new completion date of 06/30/2013. 37/77 WCAs complete through 03/31/13. Projected finish of 77th WCA is 06/17/13.

RISK & MITIGATION: Active multiplier chains (AMC) had lower than expected yield after microassembly. Rework is ongoing to qualify sufficient modules for integration into WCA. This might cause date of final WCA batches to slip. However, production of cold cartridges (from NAOJ) will not be completed until 2014, so no mitigation necessary, as delay in final batch of WCAs will not delay integration of band 10 into ALMA Front Ends.



COST: Cost to produce four FEHV units exceeds allocated budget. Budget change request submitted for FEHV cost-to-complete. Decision to implement change request and start production is on hold pending availability of budget.

SCHEDULE: Once decision is made to finalize design and start production, 12 months will elapse to fabricate the 4 units; this would go into FY2014

TECHNICAL: Delta CDR on March 19 was successful; working of action items. Major design issues have been resolved and the design is mature to make a first unit. A Delta-CCR is required to start fabrication of a first test unit that will be a proof of concept and free the fabrication of the additional units. Design is currently frozen until budget issues are resolved.

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 is not stopping the operation

POP MILESTONE #: 52
VLA Commissioning & Support
TITLE: Begin full operations (capabilities offered for FY 2012 Q4 CfP)

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
3 man-months to complete	
Material Actuals	Expected
No impact	0
Travel Actuals	Expected
No impact	0

TECHNICAL:

The WIDAR correlator is working well in the offered modes and observers are smoothly submitting scheduling blocks and receiving good quality data. However, operating the phased VLA with the VLBA+GBT is not yet smooth, and several observations will have to be repeated due to technical problems.

SCHEDULE:

Critical Path	Schedule	Actual
Phased Array	3/29/13	7/31/13
Milestone	Schedule	Actual
1 Full Operations	3/29/13	9/30/13

RISK:

Risk	Mitigation
1 Continued problems with Y27+VLBA	Y27+VLBA+GBT operations focus before further VLBA enhancements.

COST: There is no increase in the cost of VLA/VLBA operations due to the schedule delay. The primary impact is on observations that have to be held over and repeated in semester 2013B, reducing the time available for new proposals.

SCHEDULE: The need to diagnose technical problems has delayed the observation of several highly ranked science projects, which will be re-scheduled in 2013B.

TECHNICAL: In general the WIDAR correlator is working well in the offered modes and observers are smoothly submitting scheduling blocks and receiving good quality data. However, operating the phased VLA with the VLBA+GBT is not yet smooth, and several observations will have to be repeated due to technical problems.

RISK & MITIGATION: Risk: Continued failure of Y27+VLBA due to timing or other issues, reduced observing efficiency.
Mitigation: Focus on stabilizing Y27+VLBA+GBT operations rather than further VLBA capability enhancements.

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

Cost
Schedule
Technical

COST: No impact

Labor Actuals	Expected
Ops funds this activity, delay has no impact	Operations, no impact
Material Actuals	Expected
$0	$0
Travel Actuals	Expected
$0	$0

TECHNICAL:

Although the DDC was 13B's only available data path offered, many 2012 & 13A proposals carried over and continue to use legacy system. There is a reasonable concern by PI's with astrometry projects not to transition their projects during on-going monitoring.

SCHEDULE:

Critical Path	Schedule	Actual
PI cooperation	3/29/13	9/30/13
Milestone	Schedule	Actual
1 Finish transition	3/29/13	9/30/13

RISK:

Risk	Mitigation
1 Legacy formatter fails	PIs piggyback on legacy and DDC system
2 VDif formatter fails	Continue development

SCHEDULE: The astrometry projects where the PI's have requested strongly that we do not transition their projects will extend to September 2013. If other PI's find, after a piggyback experiment, that there is good reason not to transition their project, the retirement of the VLBA legacy system could be delayed until after March 2014. Although the schedule risk is low because both the legacy and DDC systems can be operated simultaneously, the drain on personnel and resources to keep the legacy system active is an issue and we are actively working with the PI's to mitigate this risk.

TECHNICAL: A detailed study of the remaining legacy projects was made, equivalent DDC modes identified and some projects were retired this Quarter. All new proposals will use the DDC. However, PI's of several large (~1000 hour) astrometry projects have strongly requested that their projects not be transitioned to remove the possibility of small errors in the derived positions. This is a reasonable concern and it is prudent to honor these requests. Some other PI's have been reluctant to transition for fear that their processing procedures would be affected. Discussions are on-going with PI's for the best way to transition each project.

RISK & MITIGATION: The primary risk with missing this milestone 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 however the formatter is becoming antiquated and is difficult to repair and we may soon loose the in-house expertise to repair it. For mitigation, we have asked PI's with non-astrometry projects to participate in a "piggyback" experiment in which their next few observations are made simultaneously with the legacy and DDC systems so they can directly compare the results. The goal is to garner user acceptance for a near term transition of legacy projects and confidence in the new DDC data path. The first piggyback observations have been prepared and are ready for the next scheduling opportunity.

POP Milestone #: 68
GBT Modifications: Digital Servo Replacement
TITLE: Control kernel delivered into integration test lab

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
$63.5	$175k
Material Actuals	Expected
$0	
Travel Actuals	Expected
$0	$0

TECHNICAL:

The remaining digital engineer is working on re-factoring the incomplete work of the lead engineer who was laid-off and this is taking some time to recover.

SCHEDULE:

Critical Path	POP	Actual
Lab testing	Q1 FY13	N/A
Milestone	POP	Actual
1 Integration Test	Q3 FY13	N/A
2 Acceptance test	Q4 FY13	N/A
3 Axle Encoders	Q4 FY13	N/A

RISK:

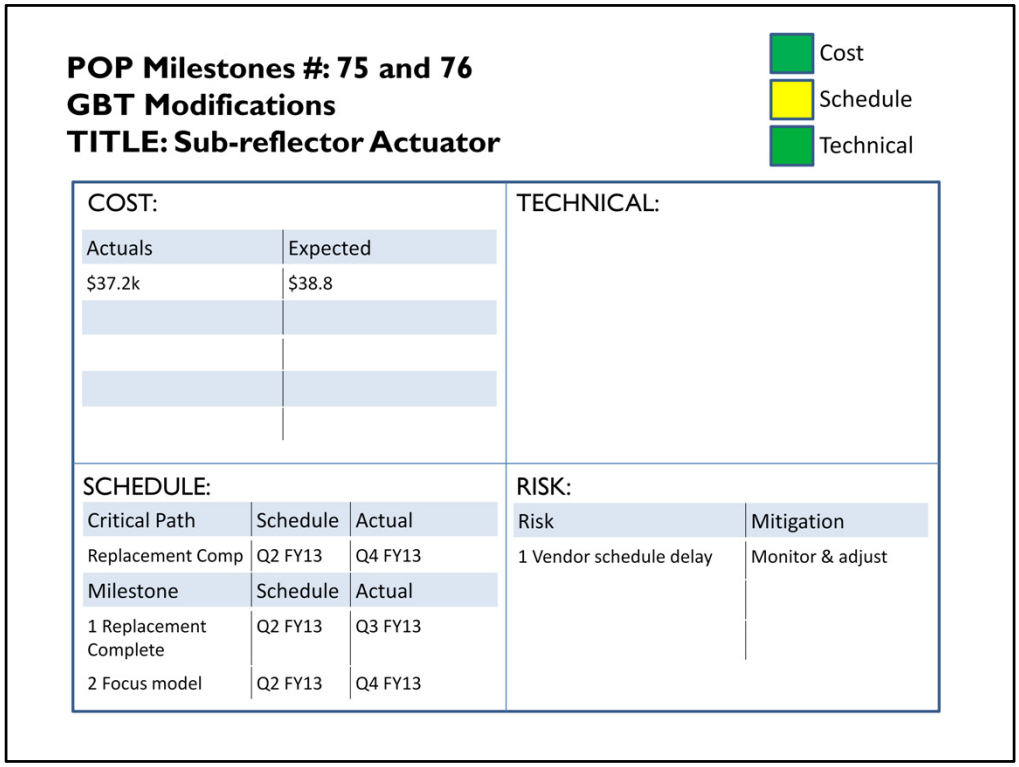
Risk	Mitigation
1 Resource availability	None

COST: The costs are running well below projections due to the availability of resources to work on the project.

SCHEDULE: As a result of losing the primary development resource and subsequently moving the project to a low-priority internal project, the POP schedule is no longer applicable. Work is accomplished as resources are available.

TECHNICAL: The biggest issue is the learning curve for the servo engineers picking up the work abandoned when the primary engineer was laid off.

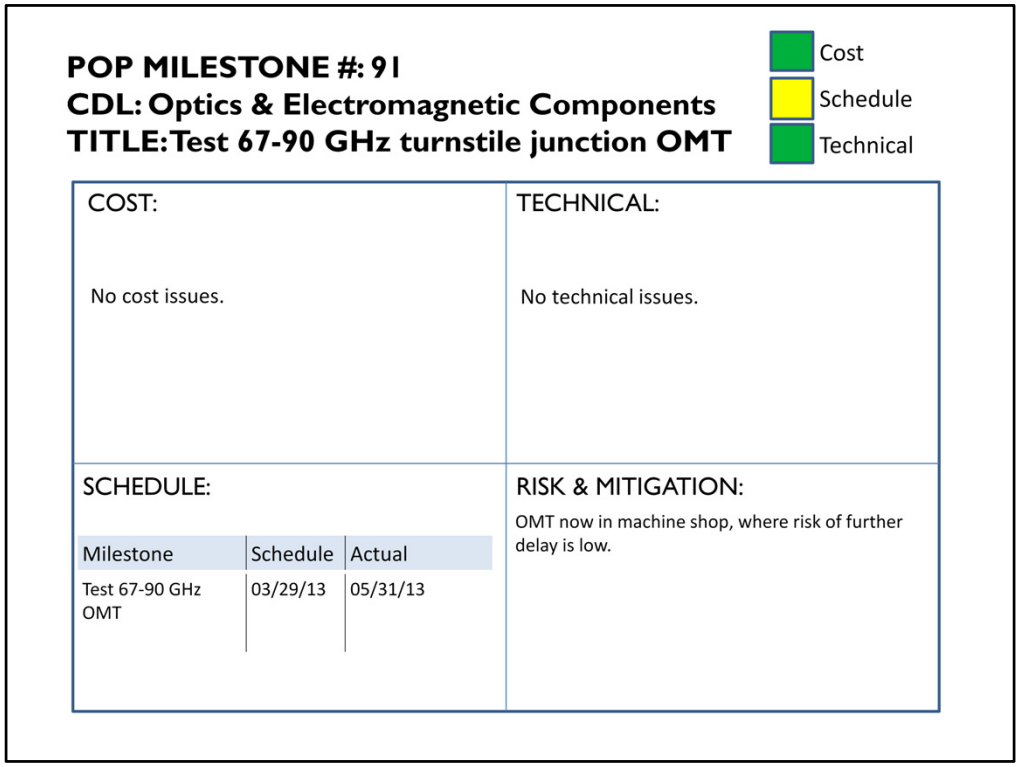
RISK & MITIGATION: The biggest risk is resource availability to do the work. Since this is a low-priority project, there is no specific mitigation.



COST: As this is an operations project only an overall budget was established.

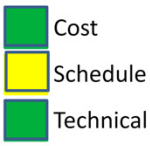
SCHEDULE: The schedule is delayed due to the delivery of reconditioned actuators from the vendor. Installation and checkout of returned units is occurring upon receipt of each unit.

RISK & MITIGATION: The vendor deliveries are being monitored and the replacement schedule updated as information becomes available.



SCHEDULE: OMT has been designed and is currently being fabricated in machine shop. Mechanical layout was delayed due to retirement of CDL mechanical designer. The designer was brought back part-time to complete this project.

POP MILESTONE #: 94
CDL: Phased Array Feeds
TITLE: Fiber installations complete



COST:

No cost issues.

TECHNICAL:

No technical issues.

SCHEDULE:

Milestone	Schedule	Actual
Fiber installation complete	12/31/12	05/31/13

RISK & MITIGATION:

Task is nearly complete. Only one fiber connection (from receiver room to GBT prime focus) remains to be installed. Will be installed when receiver is ready to test.

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

Cost
Schedule
Technical

COST:	TECHNICAL:
No cost issues.	No technical issues.
SCHEDULE:	RISK & MITIGATION:
Task no longer to be performed.	

SCHEDULE: We have decided not to further optimize the noise temperature of the current cryogenic phased array feed, but rather to complete the testing on the GBT as soon as possible and to then concentrate on understanding all the sources of measured noise. Planning is underway to determine the next steps in this R&D program after GBT testing.

POP MILESTONE #: 108
CDL: PAPER
TITLE: Ship second 25 elements of upgrade

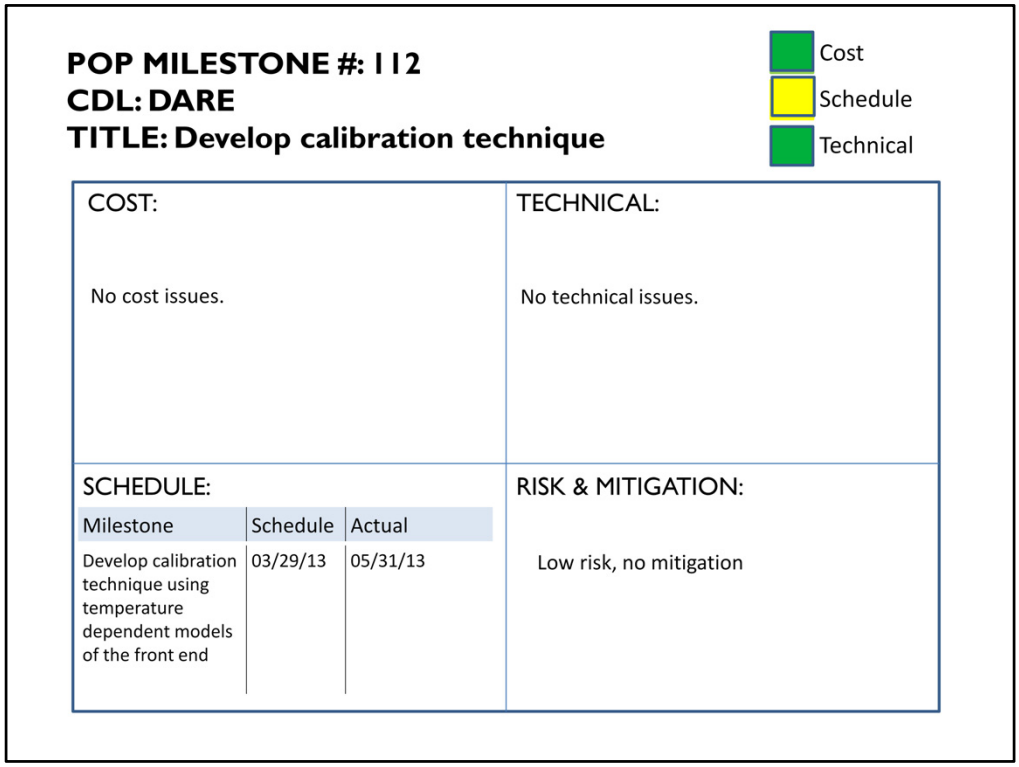
Cost
Schedule
Technical

COST:	TECHNICAL:
No cost issues.	No technical issues.
SCHEDULE:	**RISK & MITIGATION:**

Milestone	Schedule	Actual
Ship second 25 elements of upgrade	03/29/13	04/30/13

None

SCHEDULE: Second shipment was delayed due to winter weather in Green Bank. It has been rescheduled for end of April.



TECHNICAL: A test apparatus, designed to confirm the radiometer calibration procedure, is currently being fabricated. A special RF load with an integrated Peltier thermal control system was developed so that the load's physical temperature could be adjusted independently from the front-end temperature.

POP MILESTONES #: 117 & 118
ALMA Development: Band 5 Local Oscillator
TITLE: Critical design & mfg. readiness review
Band S LO Critical Design & Manufacturing Review

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
$82.2K	$508.3K
Material Actuals	Expected
$59.6K	$1,216.4K
Travel Actuals	Expected
$0.7K	$19.5K

TECHNICAL:

- Excess noise and harmonics indicated by testing with cold cartridge. 2nd iteration design change successfully tested at CDL; prototype hardware delivered to GARD and to NOVA (SRON) for verification testing.

SCHEDULE:

Critical Path	Schedule	Actual
Band 5 LO CDMR	06/15/13	TBD
Milestone	Schedule	Actual
1 Integration & test	11/30/12	TBD
2 Band 5 LO CDMR	01/15/13	06/15/13

RISK:

Risk	Mitigation
1 Continued noise and harmonic issues	Build 2nd Band 5 test LO for parallel debugging
2 Staff resources taken by ALMA-J (Band 10) production issues	B 10 WCA production extended 90 days to free resources

COST: Total expenditures through Q2 FY2013 = $143K.
Budget through Q2 FY2013 = $590K.
Total Project Budget (through Q3 FY2014) = $2,842K

SCHEDULE: Qualification testing of a pre-production B5 LO with a B5 cold cartridge at GARD delayed by technical issues at GARD. A second, preproduction B5 LO is in route to NOVA (SRON); it will be used for performance testing/debugging in parallel with GARD. CDMR and start of full production consequently delayed to no sooner than 15 June. **Further delays will impact the ESO Band 5 implementation schedule.**

TECHNICAL: GARD is testing pre-production LO with their Band 5 mixer. Excess noise beyond specification seen, also evidence of harmonic pumping of SIS mixer. Lowpass filter was delivered to GARD , tested, and improved performance albeit insufficiently. A second engineering modification was made, successfully tested at CDL, and is in transit to GARD for final test. The second B5 LO sent to NOVA will be assembled to, and tested with, a full-fledged B5 cold cartridge. Thus, the NOVA test configuration is higher fidelity than the GARD test.

RISK & MITIGATION: (1) Continued noise/harmonic issues would further delay CDMR and onset of full production. To mitigate, a second pre-production LO is in route to SRON for debugging noise problems in parallel with mixer testing at GARD. (2) Original Band 10 SOW required LO Group to complete Band 10 production by 3/31/13. Ninety-day extension granted by NAOJ; thus, enabling LO Group to allocate more resources on resolving Band 5 design issue and preparation for the CDMR.

POP MILESTONE #: 139
ALMA Development: Mm/Submm VLBI with ALMA
TITLE: Kick-off meeting

Cost
Schedule
Technical

COST: (*This is a "No Cost" NRAO Study*)

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

TECHNICAL:

- Integration "roadmap" of best AIPS and HOPS calibration and analysis programs into CASA complete.
- List of requirements complete.
- Implementation cost estimate complete.

SCHEDULE:

Critical Path	Schedule	Actual
Final rqrmnts def.	Q3/13	TBD
Milestone	Schedule	Actual
1 Kick-off meeting	01/14/13	10/15/12
2 Performance review	Q3/13	04/15/13

RISK:

Risk	Mitigation
1 No identified risks	

COST: This is a "No Cost" Study.

SCHEDULE: Study is approximately three months ahead of schedule and will conclude during Q3 FY2013.

TECHNICAL: Gap analysis is complete. List of requirements for optimizing VLBI data reduction algorithms and associated cost estimate is complete. No technical issues identified. This capability is desirable, but unnecessary, to support Phase II of the ALMA Phasing Project implementation plan (Event Horizon Experiment). This capability is necessary to support Phase IV of the APP implementation plan (configuration of ALMA as a full-fledged VLBI station).

RISK & MITIGATION: No risk issues.

POP MILESTONE #: 148
ALMA Development: Ultra Wide-band Receivers
TITLE: Intermediate performance review

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
$0	$0
Material Actuals	Expected
$70.0K	$70.0K
Travel Actuals	Expected
$0	$0

TECHNICAL:

- Prototype superconducting, parametric amplifier for ALMA Band 3 (84-116 GHz) fabricated.
- Simulation software written.
- Noise performance modeled.

SCHEDULE:

Critical Path	Schedule	Actual
Final rqrmnts def.	Q3/13	04/17/13
Milestone	Schedule	Actual
1 Performance review	03/29/13	04/15/13
2 Rqrmnts. def.	Q3/13	TBD

RISK:

Risk	Mitigation
1 No identified risks	

COST: Total expenditures through Q2 FY2013 = $70K .
Budget through Q2 FY2013 = $70K.
Total Study Budget (through Q3 FY2013) = $92.5K

SCHEDULE: Study has already surpassed contract deliverables and will conclude in early Q3 FY2013.

TECHNICAL: Excellent progress on this Study. CalTech/JPL have augmented the ALMA Development funding to the extent that they have actually fabricated a prototype superconducting parametric amplifier in lieu of the required study paper on the concept. JPL has developed simulation software and calculated expected performance. Hardware for a test apparatus has been procured; assembly/calibration/validation is underway.

RISK & MITIGATION: This Study is independent of all other ALMA Development Studies and Projects. No risk issues.

POP MILESTONE #: 155
ALMA Development:Visualization Portal for ALMA
TITLE: Kick-off meeting

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
$0	$0
Material Actuals	Expected
$60.0K	$60.0K
Travel Actuals	Expected
$0	$0

TECHNICAL:

- Deliverables are well-developed within the Cyber SKA cyber infrastructure project and require only redeployment in the ALMA use case.

SCHEDULE:

Critical Path	Schedule	Actual
Data mngmnt. Sys.	Q3/13	TBD
Milestone	Schedule	Actual
1 Kick-off meeting	01/14/13	09/11/12
2 Performance review	Q3/13	TBD

RISK:

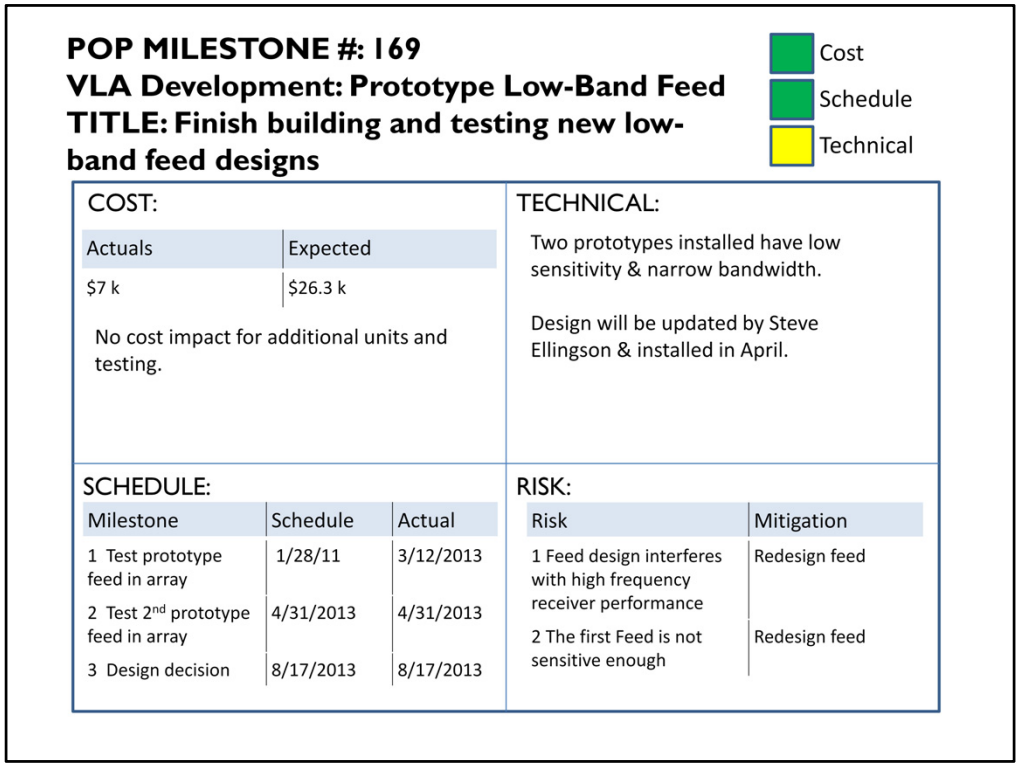
Risk	Mitigation
1 No identified risks	

COST: Total expenditures through Q2 FY2013 = $60.0K .
Budget through Q2 FY2013 = $60.0K.
Total Study Budget (through Q4 FY2013) = $73.5K

SCHEDULE: Study is approximately two months ahead of schedule and will conclude during Q3 FY2013.

TECHNICAL: The principal deliverable of this Study has been revised from the original proposal. Originally, a new visualization tool was going to be developed and integrated into the existing ALMA science portal. Now, the developers (including NRAO personnel) will build upon the existing ALMA code to affect a seamless visualization tool. Coordinating this Study with the *"Unleashing Large Dataset Science*" Study being performed by the University of Maryland, et.al. to ensure no replication of effort.

RISK & MITIGATION: This Study is independent of all other ALMA Development Studies and Projects. No risk issues

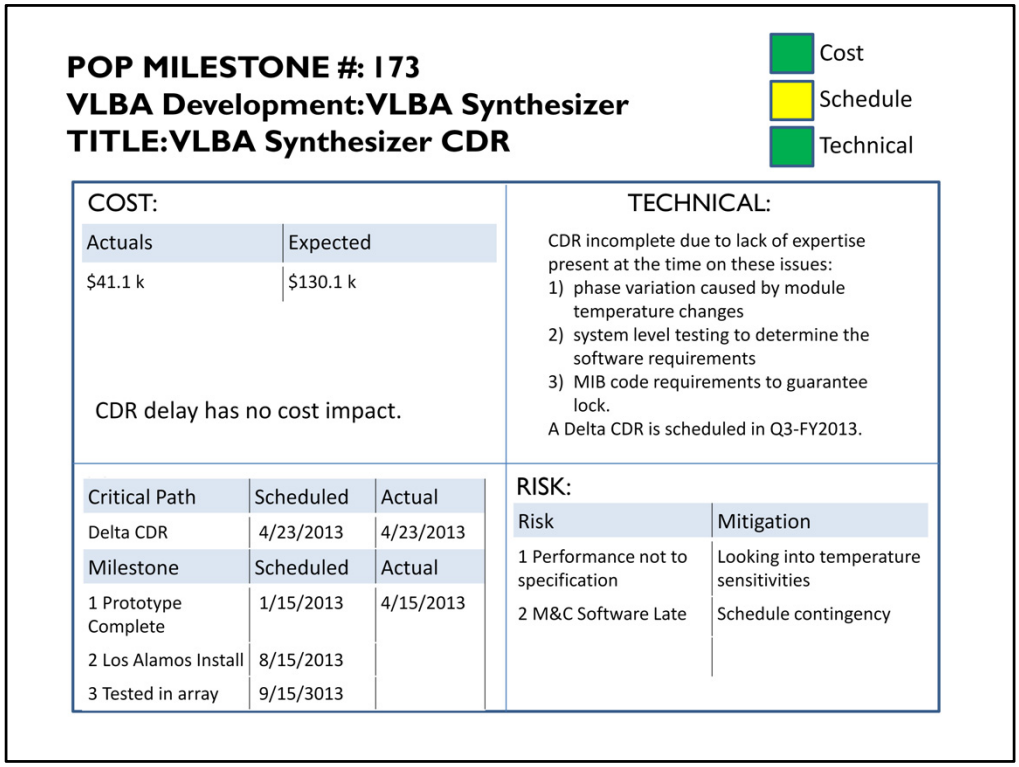


COST: There is no projected impact of the feed re-design on the allocated budget for this project.

SCHEDULE: Items in the schedule for the low-band feed design have been re-ordered to take advantage of the expertise and residency of Steve Ellingson, an expert in low-band feed design. The PDR of the original design (originally scheduled for Q3) has already taken place, including field testing on an antenna. The CDR for the re-designed feed is still expected to take place in Q4.

TECHNICAL: The prototype strut-straddling low-band (74MHz) feed was built and fully tested. The design was shown to work and can be used in observations, and it does not produce significant blockage during L-band observations. However, the prototype feed is not as sensitive as the original Erickson dipoles that have been installed in special 74MHz "campaigns" in the past. A modification to the original design is being developed in collaboration with RSRO visitor Steve Ellingson, to determine if the sensitivity and bandwidth can be improved to a useful level.

RISK & MITIGATION: The new feed aimed to provide a 74MHz capability that could remain installed at all times with minimum impact on other observing bands. The mitigation of the risk associated with not having a 74MHz system is to continue to have special 74MHz dipole campaigns, as in the past.



Electronics Division staff have been tasked with upgrading the VLBA LO Synthesizer module to use a new dithering technique that provides uninterrupted tuning of the LO in 10KHz steps. The VLBA LO Synthesizer upgrade project will result in greater flexibility during observations than the existing design provides, with improved performance. In addition, the synthesizer will be more compatible with other interferometers worldwide providing the opportunity for more collaborative efforts with global partners.

SCHEDULE: The initial VLBA Synthesizer CDR held on March 28, 2013 identified three items that were not properly addressed at the time of the CDR. These include; 1) phase variation caused by module temperature changes, 2) system level testing to determine the software requirements, and 3) MIB code requirements to guarantee lock. These issues will be responded to at a Delta CDR is scheduled in Q3-FY2013.

The bench testing of the lab prototype is going well and is meeting most specifications

TECHNICAL: Need more module level and system level testing is required.

RISK & MITIGATION: Lengthy testing and evaluation prior to install in 1st VLBA site (Los Alamos, New Mexico)

POP MILESTONE #: 176
GBT Development:VEGAS Development
TITLE:Wideband spectrometer mode successfully tested on GBT

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
$135k	$110k
Material Actuals	Expected
$3.6k	$0
Travel Actuals	Expected
$1.8k	$0

TECHNICAL:

SCHEDULE:

Critical Path	Schedule	Actual
All Vegas Modes	Q4 FY13	Q4 FY13
Milestone	Schedule	Actual
1 VEGAS Mode #1	Q1 FY13	Q3 FY13
2 VEGAS Data steam	Q4 FY13	Q4 FY13

RISK:

Risk	Mitigation
1 Not all modes delivered	Monitor

COST: The NRAO costs to support for Univ. of Calif. at Berkeley as they do mode development have been higher that anticipated. Total expenses as of Q2FY2013 are $141.867 (inc. $1,991 Admin Fee) against a spend profile of $91,516. The pace should fall back to the projected budget profile, but the $50k delta will likely not be recovered.

SCHEDULE: The schedule is mainly driven by UC-B and the NSF grant that expires the end of FY2013, unless UC-B requests for a no-cost extension. The Mode #1 acceptance will happen in March.

TECHNICAL: All NRAO technical issues are considered as nominal at this time.

RISK & MITIGATION: There is only one key risk at this time and that is the ability for UC-B to finish the modes before their grant funding expires. NRAO and UC-B meet weekly to monitor progress, and the PIs meet monthly for a status and strategy review.

POP MILESTONE #: 183
GBT Development: GBT MUSTANG1.5
TITLE: Detectors received from NIST

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
$104k	$130
Material Actuals	Expected
$7.3k	$10k
Travel Actuals	Expected
$0.01K	$1.5k

TECHNICAL:

SCHEDULE:

Critical Path	Schedule	Actual
First light (lab)	Q3 FY13	Q3 FY13
Milestone	Schedule	Actual
1 Cryo fabrication	Q1 FY13	Q2 FY13
2 Initial cooldown	Q1 FY13	Q2 FY13
3 NIST Detectors	Q2 FY13	TBD (Q3 target)

RISK:

Risk	Mitigation
1 Missed winter commissioning	Monitor & Adjust

COST: Costs are currently running below a linear projection, but the NRAO costs will ramp up as the integration activities increase in Q3-Q4FY2013.

SCHEDULE: The detectors from NIST are running behind schedule. These are donated by NIST so the leverage for pushing the schedule is limited and the NIST relationship is in Univ. of Penn's control.

TECHNICAL: All NRAO technical issues are nominal for this point in the project.

RISK & MITIGATION: The risk currently is that the NIST-donated detectors may not arrive in time to meet the commissioning schedule. If MUSTANG 1.5 is not available for shared-risk use in winter 2013, the existing MUSTANG will do whatever science can be accomplished with MUSTANG's capabilities.

POP MILESTONE #: 199
Human Resources: Compensation
TITLE: Updated job descriptions for all NRAO jobs available

Cost
Schedule
Technical

COST:

No cost issues.

TECHNICAL:

No technical issues.

SCHEDULE:

Critical Path	Schedule	Actual
	03/31/2013	07/31/2013
Milestone	**Schedule**	**Actual**
1 Project start	10/5/2012	10/5/2012
2 JDs due to HR	12/31/2012	65% Complete
3 Final JDs	03/31/2013	07/31/2013

RISK:

Risk	Mitigation
1 Lack of response on request	Track & report to DO on outstanding JDs
2 Divergence of comp manager from HR priorities	AD for HR redirects requests, when possible.

COST: The Manager of Compensation and HRIS is conducting the project and was on medical leave for most of FY13 Qtr 1.

POP MILESTONE #: 200
Human Resources: Compensation
TITLE: An electronic Performance Evaluation Process Implemented

Cost
Schedule
Technical

COST:

Labor Actuals	Expected
n/a	n/a
Material Actuals	Expected
$0	$0
Travel Actuals	Expected
$0	$0

TECHNICAL:

SCHEDULE:

Critical Path	Schedule	Actual
	3/31/2013	8/31/2013
Milestone	Schedule	Actual
1 Vendor selection	12/31/2012	5/10/2013
2 Software install	2/15/2013	7/15/2013
3 Implementation /Training	3/31/2013	8/31/2013

RISK:

Risk	Mitigation
1 Divergence of comp manager from HR priorities	AD for HR redirects requests, when possible.
2 Divergence of MIS manager from project	AD for Admin. redirects requests, when possible.

SCHEDULE: The Manager of Compensation and HRIS is a key contributor to the project and was on medical leave for most of FY13 Qtr 1. The PEP timeline was also changed for 2013 to coordinate with NRAO's fiscal year cycle, thereby creating an 18-month review for 2013 (4/1/2012-9/30/2013).

POP MILESTONE #: 213
CIS: Networking & Telecon
TITLE: Installation Internet link for the GB site

Cost
Schedule
Technical

COST:

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

TECHNICAL:

SCHEDULE:

Critical Path	Schedule	Actual
Milestone	Schedule	Actual
1 Purchase network HW	9/2012	~6/2013
2 Bring up link to WVU	11/2012	7/2013
3 Route Traffic to PSU	12/2012	8/2013

RISK:

Risk	Mitigation
Top three risks: 1 delay in access to data	Ship disks
2 reduced access to GB	Access copy in CV
3 State procurement fails and BTOP funds lost	Close contact with WV state and WVU

COST: No cost from delay in short term ($5k/month link charge is avoided).

SCHEDULE: Driven by the procurement process of WV State for network hardware in both GB and WVU.

RISK & MITIGATION: Risk that BTOP Stimulus funds for WV State will expire, continue to coordinate network hardware bid activities with State.

QSU 2 2013 - Exceptions

January 1 – March 31, 2013

Associated Universities, Inc.

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

New Activities Outside the FY2013 POP

OTO	Extend of D-configuration by two weeks
ODP	Fiber Optic Connectivity Project
ODP	ALMA Phasing Project
OAS	EPO – ALMA Inauguration
OAS	EPO – STEM Education
OAS	EPO – Press/Media Activity
OAS	EPO – Social Media & W
OAS	EPO – Visitor/Science Centers
OAS	EPO – Revenue

Exception: Fiber Optic Connectivity Project

- FO from AOS to Calama – Silica Networks
- FO from Calama to Antofagasta – Telefónica Emprasas
- Silica Networks contract signed; contract value = 1.350 USD
- Telefónica Emprasas contract signed; contract value = 0.499 USD
- Total Project cost (fixed) = 1.854 USD ($5K legal expenses included)
- Contractor performance bond in force.
- Construction permit(s) for AOS-Calama interval pending
- Construction complete scheduled for 30 September 2013
- Network installation complete scheduled for15 December 2013
- Network commissioning scheduled for 09 January 2014
- Present 100Mbps microwave link will remain active

Exception: ALMA Phasing Project

- NSF MRI Project – MIT Haystack ($2.4M)
- NRAO is a subrecipient ($1.1M) collaborating on:
  - correlator upgrades,
  - software enhancements, and
  - integration & test operations
- ALMA Board approval Q1 FY2013
- NA ALMA Development augmentation funding = $516.8K
- Critical Design Review – 22, 23 May in Charlottesville
- Phase I implementation cost estimate complete ($514K)
  - JAO/NRAO cost share in negotiation
- Phase I implementation complete Q3 FY2015

Exception: VLA (OTO) D-configuration extended

- Several challenges at the start of D-configuration:
  - Confluence of proposal deadline and start of D-config made it difficult for users to get SBs in time
  - OPT readiness
  - Network switch problem
- Solution:
  - Extend of D-config by 2 weeks:
    - Allows full science program to be completed
    - Separates proposal deadline from start of a new configuration, helps users
    - Helps to rationalize internal software development and testing deadlines

Exception: EPO – ALMA Inauguration

- NRAO EPO escorted 12 journalists and media representatives to the ALMA Inauguration media activities, including "media day" and "inauguration day"
- Media attention from visiting journalists, plus those who attended the press conference and inauguration online, generated more than 550 media "hits" in US publications, and more than 2,000 internationally. There was more coverage in the US than in any other country.
- EPO wrote the script used by the American and Canadian astronauts aboard the International Space Station in their video greeting to Inauguration attendees
- Designed and produced the ALMA Partnership brochure given to all Inauguration attendees, as well as the "2013 North American ALMA Video Collection Blu-ray/DVD package given to N.A. guests

Exception: EPO – STEM Education

- Multiple groups visited VLA for educational tours
- Multiple groups visited GB for overnight educational research using 40 Foot Telescope
- Multiple groups used the renovated 20 Meter Telescope
- NM several strands of educational events with schools

Exception : EPO – Press/Media Activity

- Issued eight press releases: Six science results, one image release, and the ALMA Inauguration release. Organized two AAS press conferences
- Produced illustrations, animations, and videos for multiple press releases, including a video celebrating diverse undergraduate student role in discovery of HCN dimer using GBT
- W50 "Manatee" Nebula unveiling event and joint publicity held in conjunction with US Fish & Wildlife Service and their contracted publicity company; image made the New York Times Science Times section
- Expanded outreach to the media by adding the Newswise newswire service to our existing AAS and AAAS mechanisms; NRAO now reaches a combined 10,000 registered journalists
- Developed our first email distribution list to reach reporters directly
- NHK filming at VLA for documentary. Sports Illustrated photo shoot at VLA.
- Noteworthy publication appearances
  - VLA/GBT/Chandra image made Science's "Top Science Photos of 2012" in Feb. issue.
  - Physics World Feb issue -- Article on Cyg X-1 citing Mark Reid's VLBA work.

Exception Title: EPO – Social Media & Web

- Facebook followers grew from 7000 to 10000 during Q2
- Twitter followers grew from 3200 to 3650 during Q2
- EPO now providing daily posts to Facebook and @TheNRAO
- Progress continuing on new public.nrao.edu site, to debut in Q3
- Continual work adjusting web content to work with new browsers and new HTML5 interpretations

Exception Title: EPO – Visitor/Science Centers

- VLA public visitation counted: 2,981 during period
- GB public visitation counted: 4,389 during period
- New GB brochure and printed calendar designed
- VLA outdoor tour sign designs delivered to sign contractor for fabrication
- Four articles delivered to STScI ViewSpace for display on large network of museum-based screens
- Several community group events hosted in GB
  - Snowshoe resort seasonal workers training
  - National Forest planning meeting
  - Americorps National Civilian Community Corps training
  - Pocahontas County Nature Club bird migration talk
  - Family Science Lab (kitchen chemistry)

Exception: EPO - Revenue

- $25,399 VLA Visitor Center gift shop gross sales during period
- $28,661 GB Science Center combined gift shop, tour, and café revenue. (Note: Café surplus-after-cost, if any, goes to GB Ops.)
- $3,080 fee earned by licensing Atacama Aerial video footage (not showing ALMA) to a non-astronomy-related documentary
- $15,505 grant received from WV Division of Tourism (offsets GB Science Center visitor awareness costs)
- Received several grants and sponsorships for summer weekend cycling festival; proceeds will benefit a community wellness/fitness center:
  - Pocahontas Fairs and Festivals Committee: $2,500
  - Pocahontas County CVB: $1,200
  - Northern Pocahontas Community Wellness, Inc. $300

QSU 2 2013 - Financials

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

FY13 Mid-year Forecast

- Overall Issues
  - Benefits running at 38% vs. 35% budgeted. Some signs of normalization, impact of HDHP. Regular benefits true-ups impact all operations.
- NRAO Ops
  - Growing WFO & research activity providing CCR revenue assistance and salary support.
  - Increasing pressures from lower than budgeted ALMA cost recovery (spending $ on fuel & site expenses vs. staffing & NAASC activities).
  - Overall, on track to a balanced budget, however unable to respond to major equipment issues/opportunities.

FY13 YTD by Major WBS Category
ALMA Ops – Q2

	FY13 POP Budget	FY13 YTD Expenses	YTD %
Telescope Ops	20,263	12,653	62.4
Development	2,992	889	29.7
Science Ops	5,363	2,688	50.1
Admin Services	5,045	4,310	85.4
Director's Office	2,291	993	43.3
Total	35,954	21,532	59.9

- Telescope Ops includes power installment payment to ESO (not part of POP). Many open PO's for long lead spares & for year long services & spares.
- Development underspend related to Chile Fiber Optic Link project which shows up in Admin services (overspend).
- ALMA Ops will come in within resource envelope.

FY13 YTD by Major WBS Category
NRAO Ops – Q2

	FY13 POP Budget	FY13 YTD Expenses	YTD %
Telescope Ops	16,793	7,205	42.9
Development	4,056	2,157	53.1
Science Ops	6,414	3,882	60.5
Admin Services	13,944	7,031	50.4
Director's Office	4,545	2,188	48.1
Total	45,752	22,463	49.1

- Telescope Ops – maintenance loaded in 2nd half.
- Development programs – includes some expenses being funded by WFO revenue not yet recognized.
- Science Ops – major travel in first half, open PO's for summer students & Post Docs.
- Admin services – decreased cost recovery from ALMA ops, benefits expenses running high; full year payouts for some lease expenses & insurances.