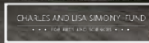


Rubin Observatory

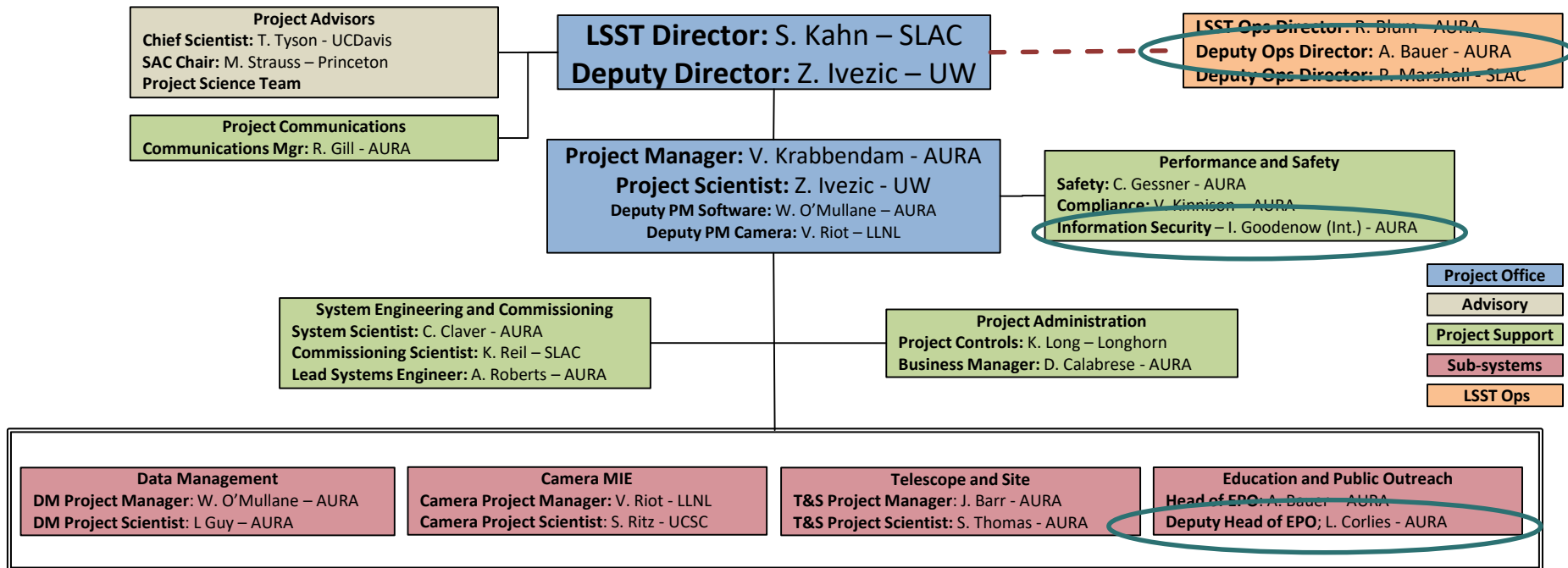
Project Management Overview

Victor Krabbendam

Rubin Observatory Project Manager

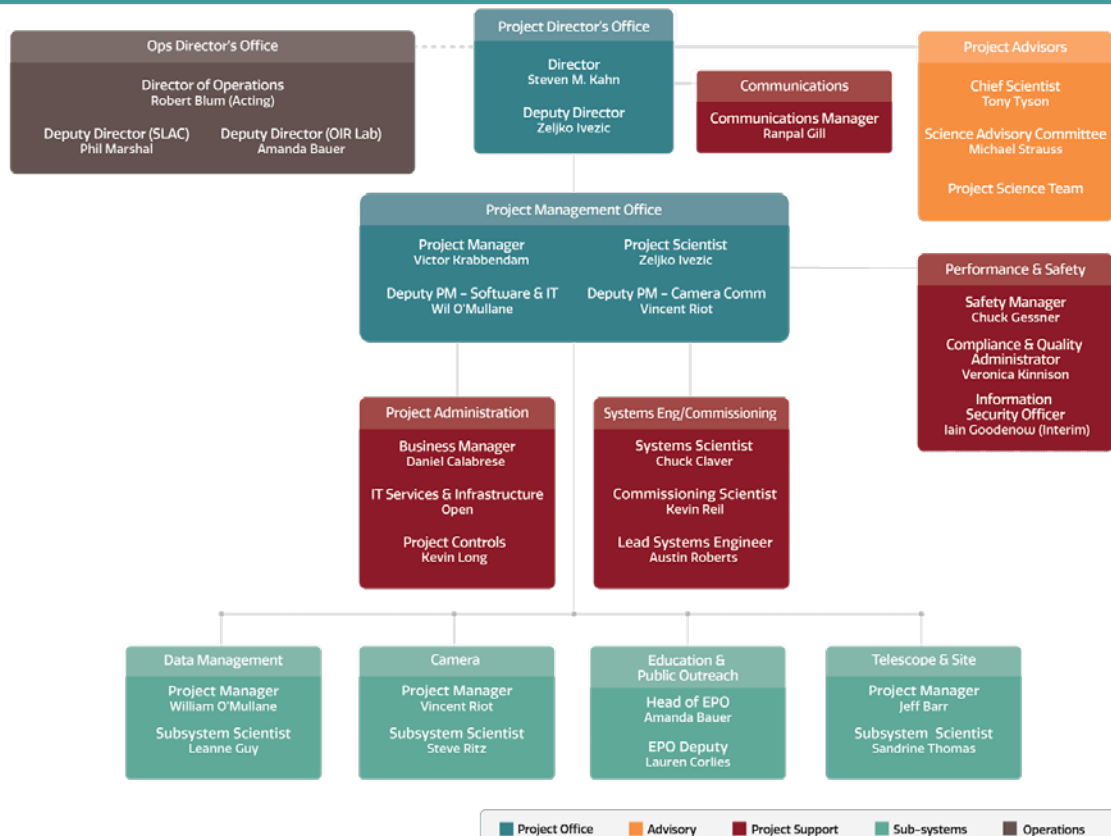


Rubin Observatory Construction Organization



- No significant changes but several good additions
- Details in subsystem overviews and breakouts

Project Organization Structure



Rubin Observatory

2019 Issues Update

1. Dome, Telescope Mount and Safe Integration
2. Cost / Schedule Recovery (Scope Options)
3. Summit Work planning and Organization
4. Staff transition
5. General Follow-up and Review Recommendations



1) Dome, Telescope Mount and Safe Integration Dome Development and Schedule

- Dome Development is a “fixed-price” contract to European Industrial Engineering (EIE) in Italy for design, fabricate, build and install of a functioning system (original price was \$12.5M)
- In 2018 EIE announced severe cash-flow issues (+\$3.5M)
 - Default, Arbitrate/Sue, or Partner (too much remaining work to continue alone)
 - Forward funded and established tighter controls,
 - Reconciled FDR design changes and took control of site subcontractors
- In December 2019 EIE announce over-runs and additional cost impacts from Design Changes (+\$2.5 - \$3M)
 - Reconciled new design changes
 - Taking control of 4 subcontracts in Italy
 - Fabricating parts in Chile
- Back-drop for T&S progress report and continued good safety record

1) Dome, Telescope Mount and Safe Integration TMA Development and Schedule

- TMA did finally arrive on the summit safely in September 2019
- Site Integration had specific Summit Criteria
 - Dome Crane
 - Dome Rotation for access and crane reach
 - Enclosure for Azimuth Track installation
 - Installation Crane or Pflow lift
- All conditions were met – Details in T&S Status
 - Provisional Dome Crane
 - Provisional Friction Drive
 - Temporary Enclosure
 - External 500 Ton crane
- TMA installation was ahead of schedule before Shutdown

1) Dome, Telescope Mount and Safe Integration Dome and TMA Site integration

- Elaborate Dome Rotation procedure in place
- Safety, Technical, Management coordination has been successful
- Dome effort suffers some delays but both integration efforts advancing very well

Work Coordination and Controls
sufficient; allowed progression to 3
cranes and 2 man lifts

Much more in T&S
summary and Safety
Breakout



2) Cost / Schedule Recovery (Scope Options) 2019 Status: \$14.8M Contingency and 3.5 mo.

EVMS Executive Summary – June 2019 Data



	MREFC - NSF	LSSTCam – DOE
% Complete (June 2019)	72	94
SPI	0.99	0.97
CPI	0.98	0.97
Contingency (EAC)	\$14.8 M	\$2.5M
Contingency % Remaining Work (EAC)	27*	23

** Work remaining is \$55M for T&S, Sys Eng. and Commissioning – remainder is cost-capped

2.0 Do the performance to-date and C&S trends give confidence that the project can complete successfully on time and within budget?

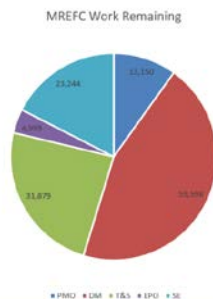
Joint Status Review • Tucson • August 27th – 30th

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MREFC Work Remaining



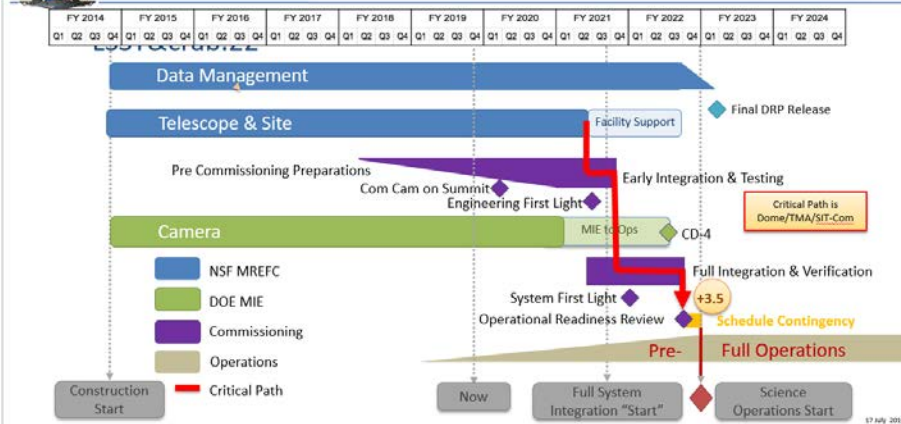
- \$14.8 M is small amount
- All contingency held by Project
- DM and EPO are on track
 - Performing to Plan
 - Risk Exposure = Scope Options
- T&S + SE = \$55.1M
- PMO + DM + EPO = \$77.7M
- Total work to-go (EAC) = \$133 M



Joint Status Review • Tucson • August 27th – 30th

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LSST Schedule – 3.5 Months Contingency

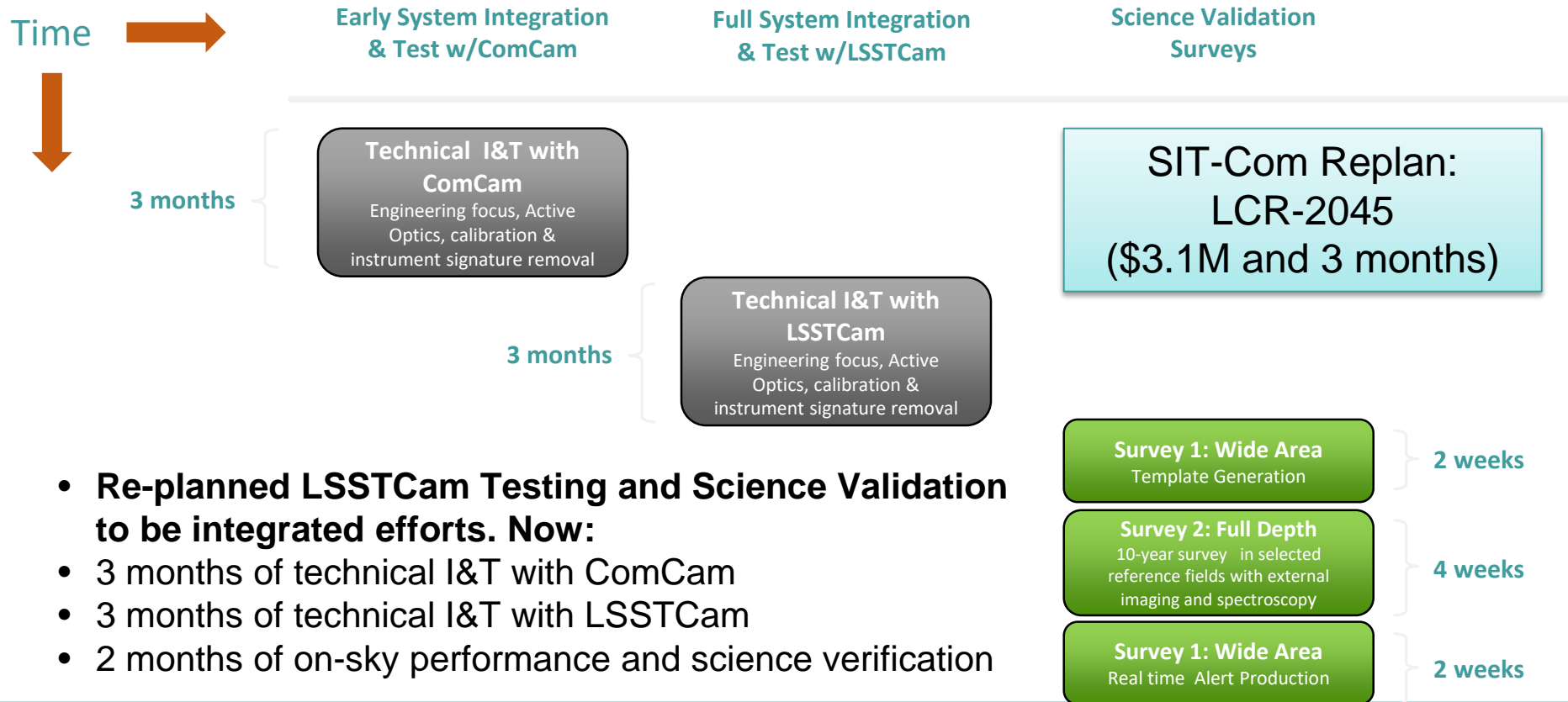


Joint Status Review • Tucson • August 27th – 30th

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- \$14.8 M was recognized as low for this stage of Project
- 3.5 months schedule contingency recognized as low, particularly with known site pressures.
- Enacted contingency focus on critical efforts but top scope option review was initiated

2) Cost / Schedule Recovery (Scope Options) SIT-Com Testing and Validation Re-planned



2) Cost / Schedule Recovery (Scope Options) DM Production Hardware

- LSST Data Management included \$11M in hardware purchases starting in 2021:
 - We must retain sufficient hardware to allow DM development and the processing of Commissioning data;
 - LCR-2148 de-scope of \$8.1M out of the \$11M
 - Impact is the elimination of DR1 hardware, delays and/or incomplete alert production in years 1 & 2 and reprioritizing purchasing of hardware in operations.
- Reduction of Commissioning by 3 months also yielded \$3.1M

3) Summit Work planning and Organization

New T&S Organization/Leaders functioning well

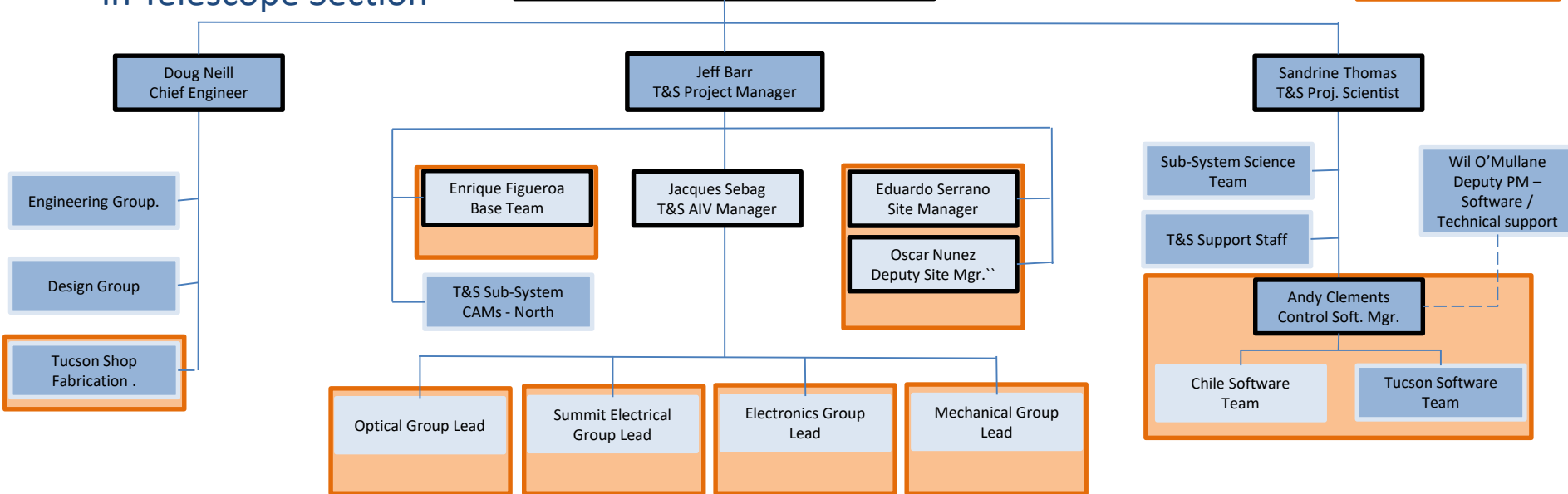
- Key is broader local leadership of teams
- More from Jeff Barr in Telescope Section

Represents Tucson Based Staff

Represents Chile Based Staff

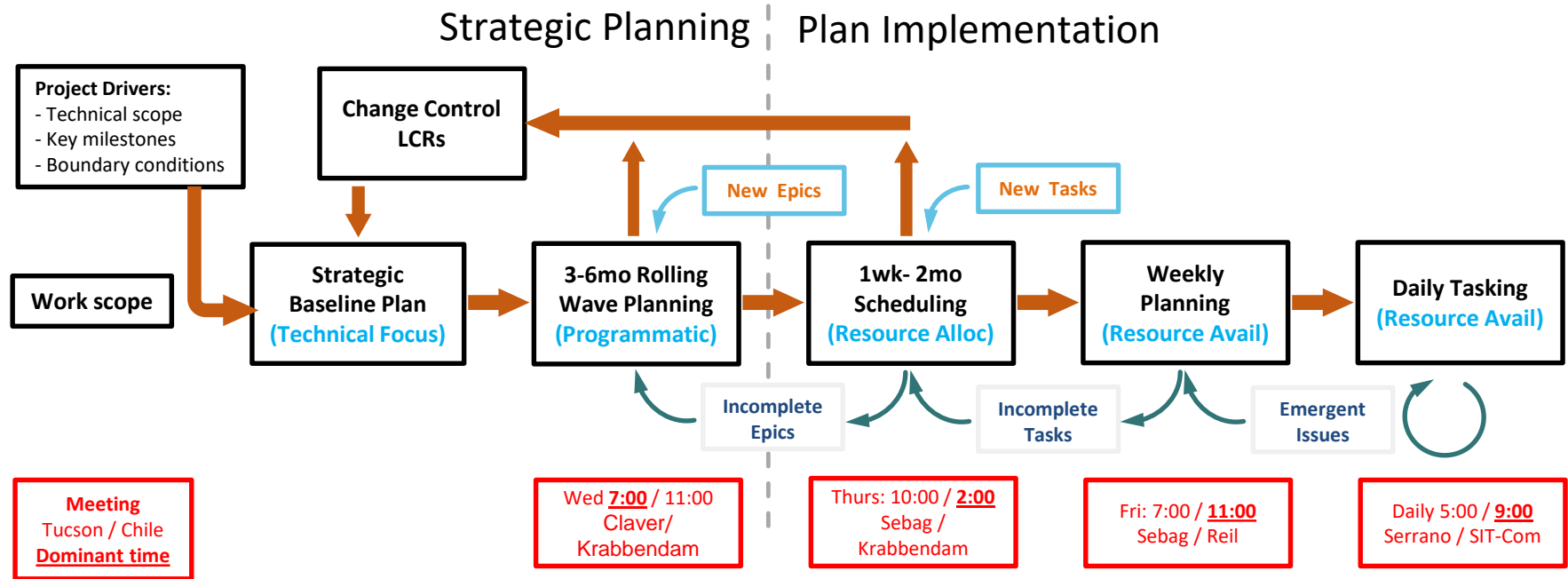
Represents group of staff with a local lead

Victor Krabbendam: LSST Project Manager
Wil O'Mullane: Deputy Project Mgr – Software
Vincent Riot: Deputy Project Mgr – Camera



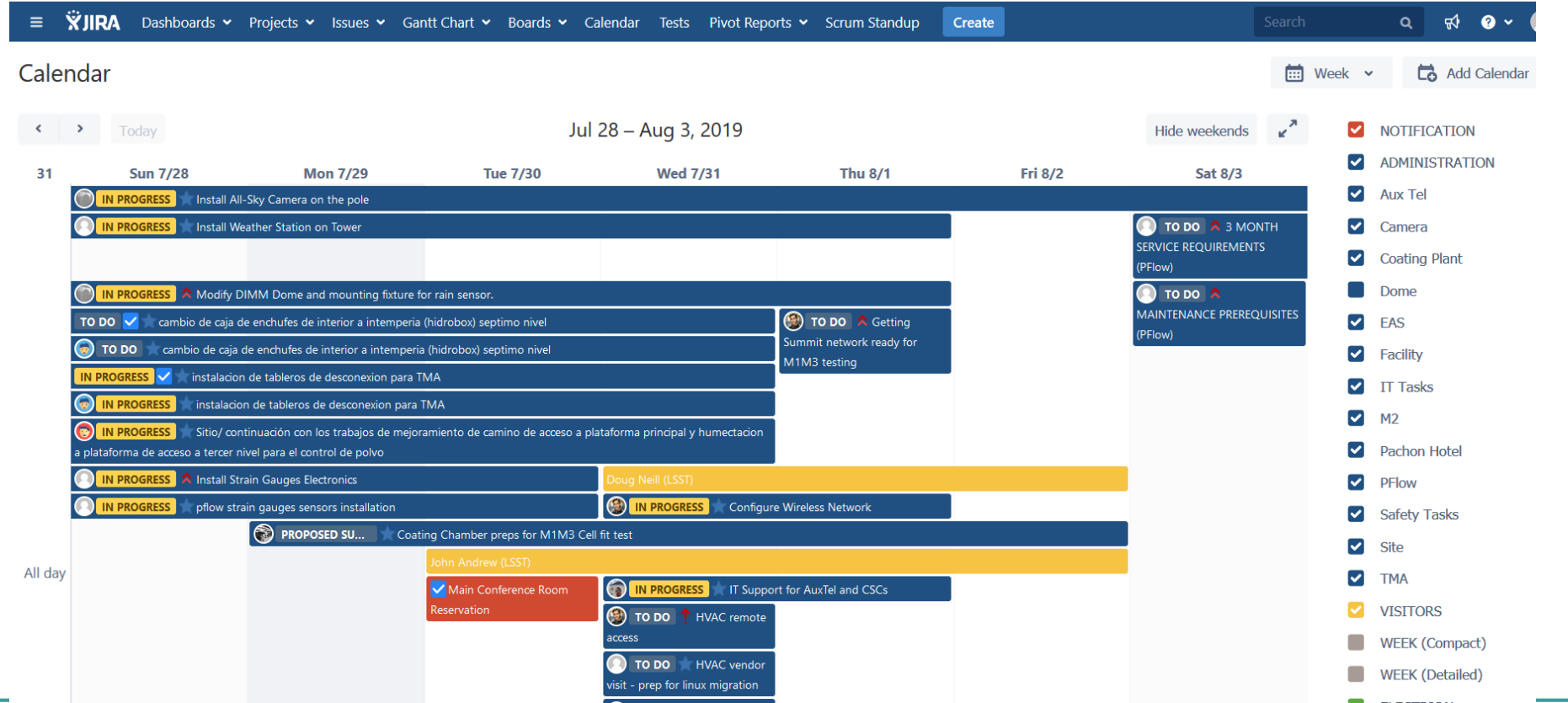
3) Summit Work Planning and Organization

Workflow Prioritization/Scheduling working well



3) Summit Work Planning and Organization

Jira work coordination for Summit working well



- Construction is focused on defining staff transitions
 - Employment continuity provides security to keep staff through Construction
 - Rubin Operations or general SLAC, NOIRLab Organizations for trajectories
 - Working on 1) Identifying Staff and 2) Determining transition date/ramp
- Working with Operations leadership (Bob, Phil & Pre-Ops Team) on staffing by name
 - Operations has 126 of 163 FTE positions named
 - Largely Construction staff with Data Facility representing largest un-knows
 - Bob will address details in Operations Update
- Construction View is to consider all current staff
 - AURA PMO, DM, Telescope, EPO
 - SLAC DM and Camera
 - Critical Partners for DM and Camera

4) Staff Transitions AURA Example

- Rubin Construction team at AURA is 115 full time Staff
 - 71 Named in Operations Plan
 - 27 Identified for NOIR Lab (IT, EPO, Engineering)
 - 17 Expected to be done with construction; ~4 would be flight risk
- Finalizing the details to have discussions with Staff in August

1) Chile Social Unrest October 2019 Disruptions

- 11 days of direct impact on the summit
- Significant increase in staff tension and Individual disruptions
- **DOE personnel travel authorizations declined by Embassy**
- Non-critical work has delayed
- AURA initiated 2 independent security assessments – upgrades in progress
- Referendum vote in October 2020



2) Completeness Criteria and Transition

Incremental Completion and Handover

Incremental completion and individual “ORR”s:

- Originally planned as one completion milestone
- Could handover elements of Construction that are completed
- Current delays emphasize opportunity

Incremental Acceptance

- Formal closure of completed scope elements
- Simplifies Final acceptance
- Supports possible incremental handover

Incremental Handover to Operations

- Where there is completion.....does it make sense to handover?
- Does it make sense for Construction and is Ops Ready?
- An opportunity for both being considered in planning

2) Completeness Criteria and Transition Incremental Completion and Handover

Agencies are open to modified approach

- Solid Operations team in place and plans developing
- Construction is extending and replanning
- Willing to consider incremental handover as completion is achieved

Rubin Construction is completing various scope elements

- Base Facility
- Summit Hotels

Construction has chosen to have NOIR Lab Central Operation Services (COS) run these completed facilities

- Per-use and proportional costs to manage/operate
- Model is now the same as Rubin Operations so formal ORR' would be seamless

What else? AuxTel, EPO, parts of DM?

Significant Focus has been on New Name

- Style guide - English/Spanish

<https://project.lsst.org/documents/name-use-guide>

Using the new name

- At first mention write Vera C. Rubin Observatory
- Subsequent mentions: Rubin Observatory or Rubin
- Do not use VRO

Initiated New Logo development (Communications & EPO joint effort)

- Survey sent to Project, Ops and SAC
- Design guideline → develop logo
- PCW → reveal new logo (maybe optimistic!)

Initial Reveal in January 2020 at AAS



3) Naming and Identity

New Logo development timeline

Date	Activity
21 April	Distribute survey
10 May	Close survey
10 May - 10 July	<ul style="list-style-type: none">• Process survey results.• Present draft design brief• Iterate on design brief• Approve design brief
10 July - 21 August	<ul style="list-style-type: none">• Develop logo designs• Iterate on 2 designs• Approve logo
21-28 August	Inform funding agencies
Early Sept	Announce new logo and brand
21 August	Start developing branding guidelines
Early Sept	Start rolling out brand

3) Naming and Identity

Visual identity for Agencies also being addressed

Completion of the Base
Facility in La Serena



Entrance to the
Summit Facility



4) Safety and COVID-19

Site Safety and Coordination

- Project and Review Committees have recognized the issues and concerns for Safety on site as parallel activities increase
- Project has significant experience in work coordination on site and managing safety conditions for all workers
 - Besalco and EIE on the main platform
 - Pflow lift and Besalco and EIE
 - Base Facility in office/residential populated compound
 - Initial phase of TMA and Dome
- Safety, Technical, Management teams remain coordinated
 - Setting clear priorities and routine coordination
 - Frequent and constant communication
 - Review and collaborate

Coordination has gone well

4) Safety and COVID-19

Road Safety remains a priority

- New Rubin Obs. Dedicated bus in use this year
- Tight control and monitoring of heavy loads and arrivals
- Continue variety of communication and education measures

Still have an excellent record but still have accidents

- Dedicated Safety Breakout Wednesday
 - We are dealing with a lot and have a good record
 - Maintaining 3 Rubin Coordinators on Site plus one for each contractor
 - Communication, Coordination, Controls, Tooling
 - Hazard Analysis and verification
 - COVID-19 mitigations



4) Safety and COVID-19

New Challenges with COVID-19

Chilean social unrest crisis was instead COVID-19 by end of February

- AURA COVID-19 Crisis Team (Victor, Ranpal, and Chuck)
- All Facilities closed - Rubin POCs identified for managed access
- Personal Protection Equipment (PPE) procured early

Enabled Work-from-Home as necessary

- Large part of team already functioned well remotely
- Office furniture and equipment repositioned where necessary
- COVID-19 Administrative Safety account set-up

Converting all meetings to virtual since mid-March and extending well into September

- JDR in July and JSR in late August
- Rubin PCW in August
- And more

4) Safety and COVID-19

New Challenges with COVID-19

Travel and shelter-in-place orders

- Lots of cancellations
- Accelerated one short-term move to Chile for ComCam
- Postponed 3 moves to Chile (one was in progress)
- Two Chilean ex-Pats temporarily back in US
- Two Staff stranded in Spain awaiting Visa renewal interview

Essential work declarations

- Safety of staff and families continued as primary objective and
- Following guidance and mandates from Government Authorities
- Remained on Summit for 1 week but had to shutter
- Critical Tucson shop and testing work continued through March
- ComCam health check work continued in La Serena thru mid-May

Steady state but Site visits increaseing - planning for restarts

4) Safety and COVID-19

COVID-19 Timeline

Date	Action taken
5 March	Algorithms Workshop switch to Virtual
12 March	International Travel stopped
12 March	Domestic Travel - case-by-case Director approval required
13 March	Tololo and Pachon “closed” - (minimum team - essential only)
16 March (week)	Initial work from home - case-by-case week
17 March	SLAC shuttered
20 March	Rubin Summit Construction Site shuttered
23 March	Tucson work from Home
2 April	Tucson Offices and Shops shuttered
9 April	Rubin Project & Community Workshop 2020 cancelled

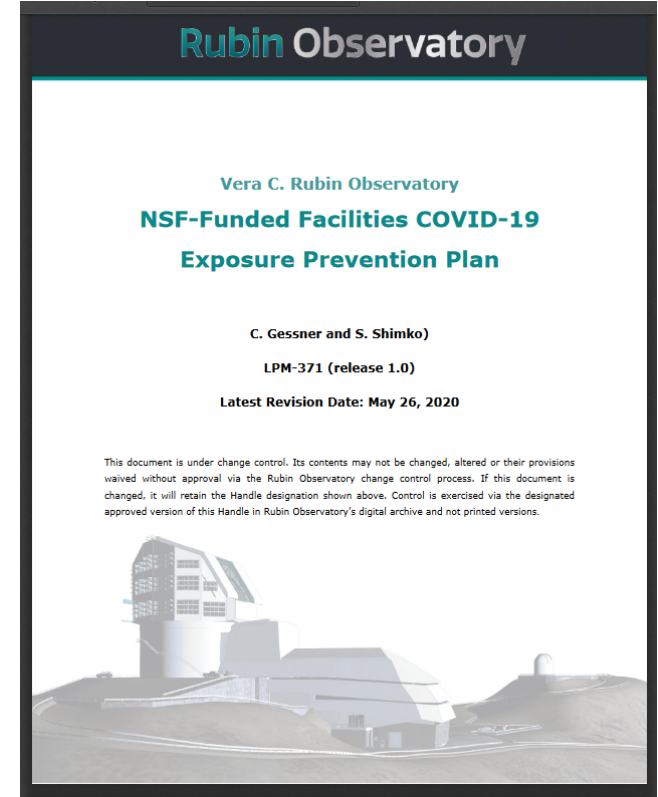
4) Safety and COVID-19

Safety Precautions key for Phase 0 and start-up activities



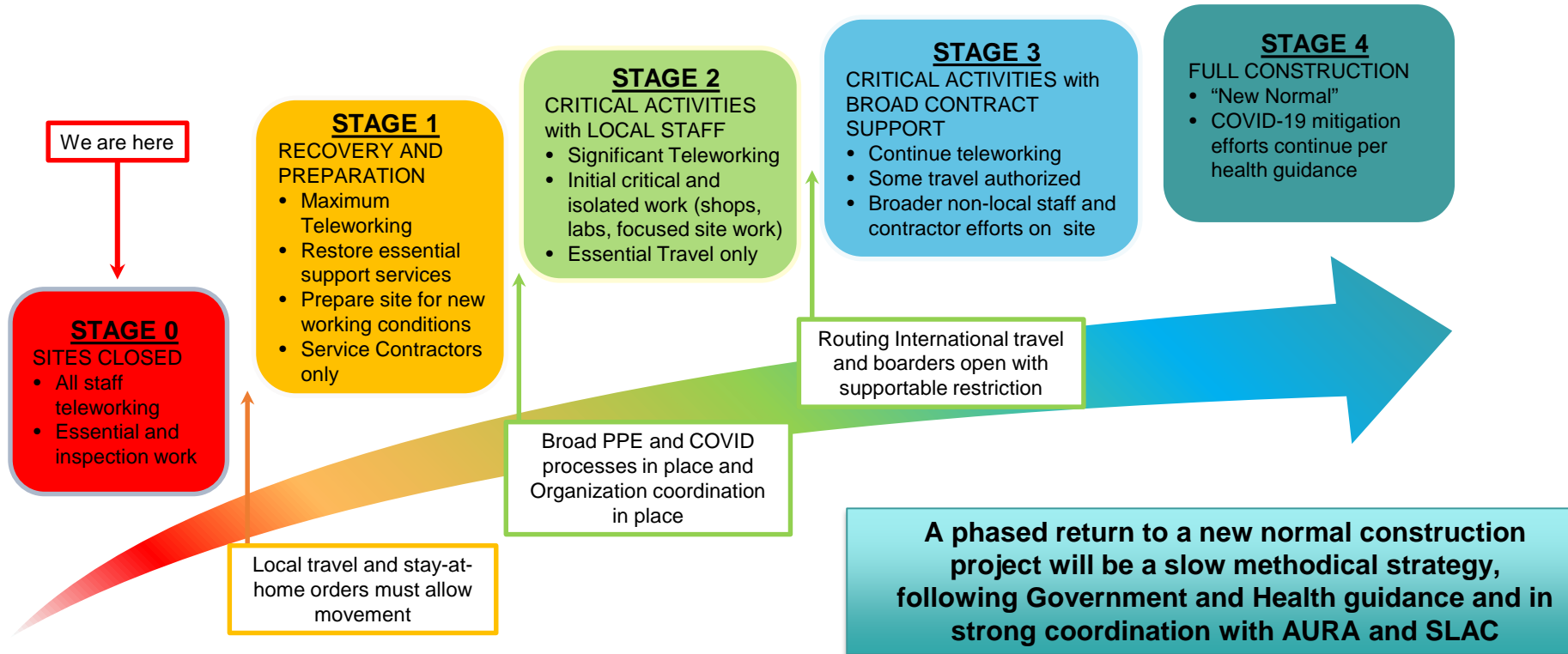
Project has collaborated with AURA and NOIRLab on Exposure Prevention plan. - SLAC has similar and other institutions too.

AURA plan is consistent with Tucson, La Serena, Summit needs - Site specific procedures cover local details



Restart Planning

Rubin Construction will have a phased return to Work



Location Specific plans for each phase

Rubin Observatory

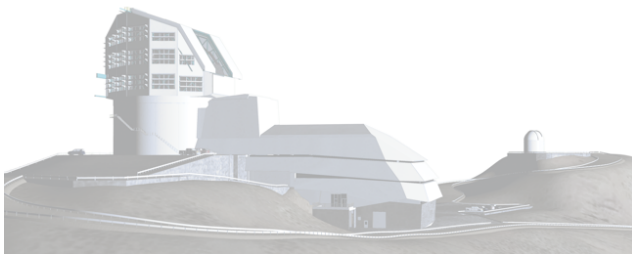
Vera C. Rubin Observatory COVID-19 Phase 0 Tucson HQ Critical Activities Restart Plan

Daniel Calabrese

LPM-391 (rel 1.0)

Latest Revision Date: June 22, 2020

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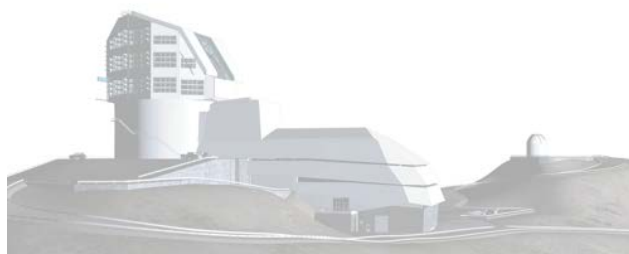
Vera C. Rubin Observatory COVID-19 Phase 0 Critical Activities Plan for Chile

Jacques Sebag

XXX

Latest Revision Date: July, 2020

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Summit Weather adding activities and challenges



COVID-19 Restart Planning

Visits to Site include targeted protection tasks



Keeping TMA azimuth bearing lubricated



Lubricating the Dome bogies



Arrival of the ComCam integrating



Maintaining TMA hydraulic jacks



Move crates to interior storage



Removal of the 200-tn crane

COVID-19 Restart Planning

Planning details of Phase 1 Re-start

Rubin Observatory

Vera C. Rubin Observatory Stage 1 Restart Plan Chile Summit

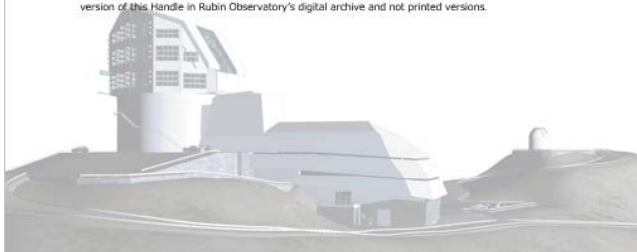
J. Sebag, G. ~~Corveto~~, E.

Serrano, C. Chirino

LPM-xxx (release 1.0)

Latest Revision Date: June XX, 2020

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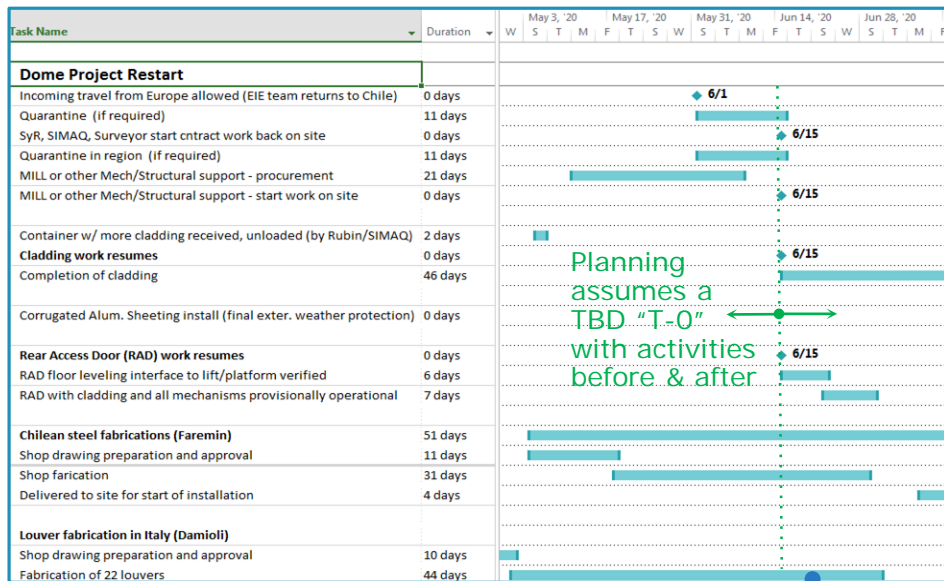
COVID-19 Restart Planning

Technical Planning to re-start

Technical leads for the Summit based subsystems are actively planning for the re-start

On-line worksheets of activities & their prospective timing

Input to be incorporated into PMCS schedule/budget



Examples of restart planning for Dome and ComCam Activities

ComCam and Pathfinder Restart Plan						
Pre-Requisites	Enabled Tasks	last updated 04/22/20	Status	Type	Duration(Days)	Estimated Restart
Facility requirements:						
Power Available	T-0		Milestone	0	6/15/2020	6/15/2020
Facility Cranes +crew Available	Needs		Milestone	0	6/15/2020	6/15/2020
Trailers +operators Available			Milestone	0	6/15/2020	6/15/2020
Network Available			Milestone	0	6/15/2020	6/15/2020
HVAC working for Computer room and Clean Rooms			Milestone	0	6/15/2020	6/15/2020
Base Prep Activities						
IT deployment system			Activity	14	4/20/2020	5/4/2020
CCS upgrades			Activity	7	5/4/2020	5/11/2020
EFD deployment			Activity	7	5/11/2020	5/18/2020
DM deployment			Activity	7	5/18/2020	5/25/2020
Integration testing			Activity	7	5/25/2020	6/1/2020
Ops rehearsal			Activity	7	6/1/2020	6/8/2020
Coordinate transport			Activity	7	6/1/2020	6/8/2020
Packing ComCam			Activity	7	6/8/2020	6/15/2020
Load ComCam			Activity	1	6/15/2020	6/16/2020
Summit Prep Activities						
Recommission Clean Rooms			Activity	7	6/16/2020	6/23/2020
Installation of Servers			Activity	2	6/16/2020	6/18/2020
Unload ComCam			Activity	1	6/16/2020	6/17/2020
Reconfigure ComCam (lifting)			Activity	1	6/17/2020	6/18/2020
Wipedown ComCam (prep for moving to white i			Activity	1	6/18/2020	6/19/2020
Technical Activities						
Power On ComCam			Activity	2	6/23/2020	6/25/2020
ComCam Functional Testing			Activity	2	6/25/2020	6/27/2020
Powerdown ComCam			Activity	1	6/27/2020	6/28/2020
SLAC Travel restarts			Milestone	0	7/1/2020	7/1/2020
Finish Quadbox electrical work			Activity	10	7/1/2020	7/11/2020
Integrate Pathfinder and Quadbox			Activity	10	7/11/2020	7/21/2020
Pathfinder Functional Testing (cold)			Activity	10	7/21/2020	7/31/2020
Pathfinder Functional Testing (cryo)			Activity	30	7/21/2020	8/20/2020
Install ComCam+PF with Mass Simulator			Activity	5	8/20/2020	8/25/2020

Tabs of current worksheets — General Reqs — TMA — Dome — M1M3 Cell — AuxTel — ComCam+PF — IT — More being progressively added

COVID-19 Restart Planning Risk Assessment for Shutdown and Start-up (1)

Risk ID	Risk Title	Risk Description
RM-1969	Exposure to Site Conditions	IF there are adverse weather conditions or a seismic event THEN we can experience damage to elements on site.
RM-1970	TMA Damage during Shutdown	IF there is exposure to the weather or a seismic event, THEN the TMA components on the site could be damaged
RM-1971	Dome Damage during Shutdown	IF there is weather or seismic events during the shutdown, THEN the dome could be damaged.
RM-1972	Facility Damage during Shutdown	IF there is weather exposure or a seismic event during this COVID-19 shutdown, THEN there could be damage to the facility
RM-1973	Insufficient Inspection and Repair	IF the inspection visits or working restrictions cannot resolve technical issues THEN there could be equipment damage.
RM-1974	Delay in Coating Repairs	IF system leaks or other technical failures are not identified or work restrictions do not allow thorough or timely repair, THEN there will be additional damage to the system and or its components.
RM-1975	Shipping storage/Handling Damage	IF there is damage or an unsafe condition of materials following shipping, THEN there could be financial losses that cannot be recovered or additional damage to components.
RM-1977	Loss of Key Personnel	IF the current shutdown causes employees or staff from critical contractors to leave, THEN the startup and remaining work will be impacted and less efficient, possibly requiring full new procurements.
RM-1978	Loss of Rubin Staff	IF Rubin Construction loses key staff during the COVID-19 hiatus, THEN there will be loss in efficiency in the transition back to construction and some period of time thereafter.
RM-1980	Loss of Contractor Staff	IF we are not aware of key contractor staffing or business conditions while developing start-up plan THEN we could be faced with an extended period to replace

COVID-19 Restart Planning Risk Assessment for Shutdown and Start-up (2)

Risk ID	Risk Title	Risk Description
RM-1981	Contractor and Service Provider Availability	IF the contractors or service providers are not available as anticipated in the start-up plan, THEN there could be significant delays.
RM-1982	COVID-19 Exposure	IF any staff contract the COVID-19 virus during the shutdown or transition back to full construction, THEN there will be staffing impacts and additional delays.
RM-1983	External Start-up Constraints	IF the start-up conditions are more restrictive or do not match our start-up plans, THEN we could have additional costs or schedule delays.
RM-1984	Availability of PPE and Cleaning Services	IF the availability of PPE or necessary cleaning services are not available or not consistent with the plan, THEN there could be additional premium costing or delays.
RM-1985	Start and Work Authorization timing	IF the start-up of each site or staff location does not proceed as planned, THEN there will be impact on the start-up logic and staff/contractor availability.

Risks are guiding shutdown planning and transition priorities but assessments depend on boundary conditions established with Agencies for Re-Baseline

Rubin Observatory

MREFC Programmatic Status



	MREFC - NSF
% Complete (Feb 2020)	81
SPI	0.99
CPI	0.98
Contingency (EAC)	\$26.0M
Contingency % Remaining Work (EAC)	29

- Remaining NSF Contingency, % $(TPC - BAC - CV) / (EAC - ACWP)$

Contingency has improved

- SIT-Com Replan: LCR-2045 (\$3.1M and 3 months)
- DM Hardware Descope: LCR-2148 (8.1M)

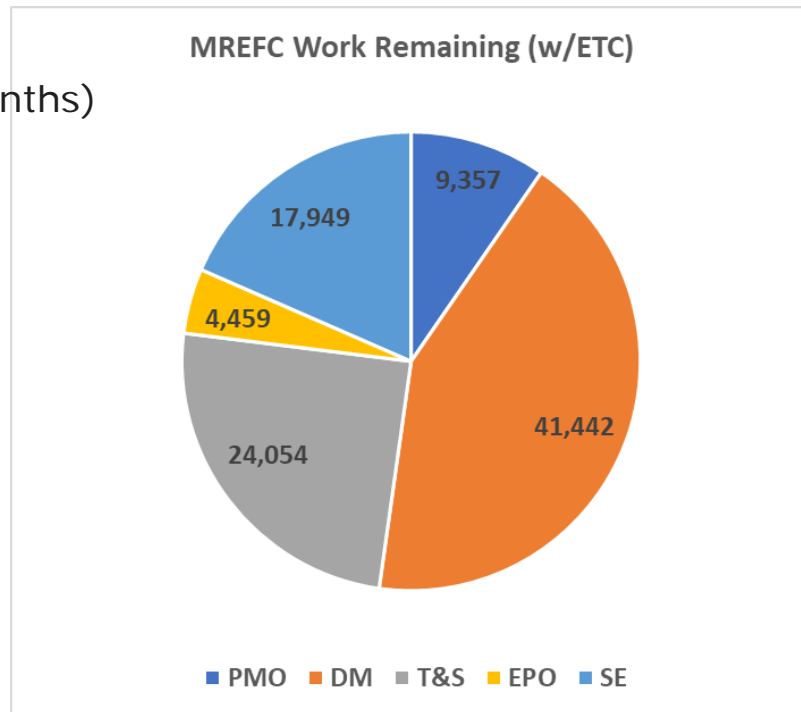
DM and EPO are on track

- Performing to Plan
- Risk Exposure = Scope Options

T&S + SE = \$42.0M (EAC)

PMO + DM + EPO = \$55.3M (EAC)

Total work to-go (EAC) = \$97.3 M

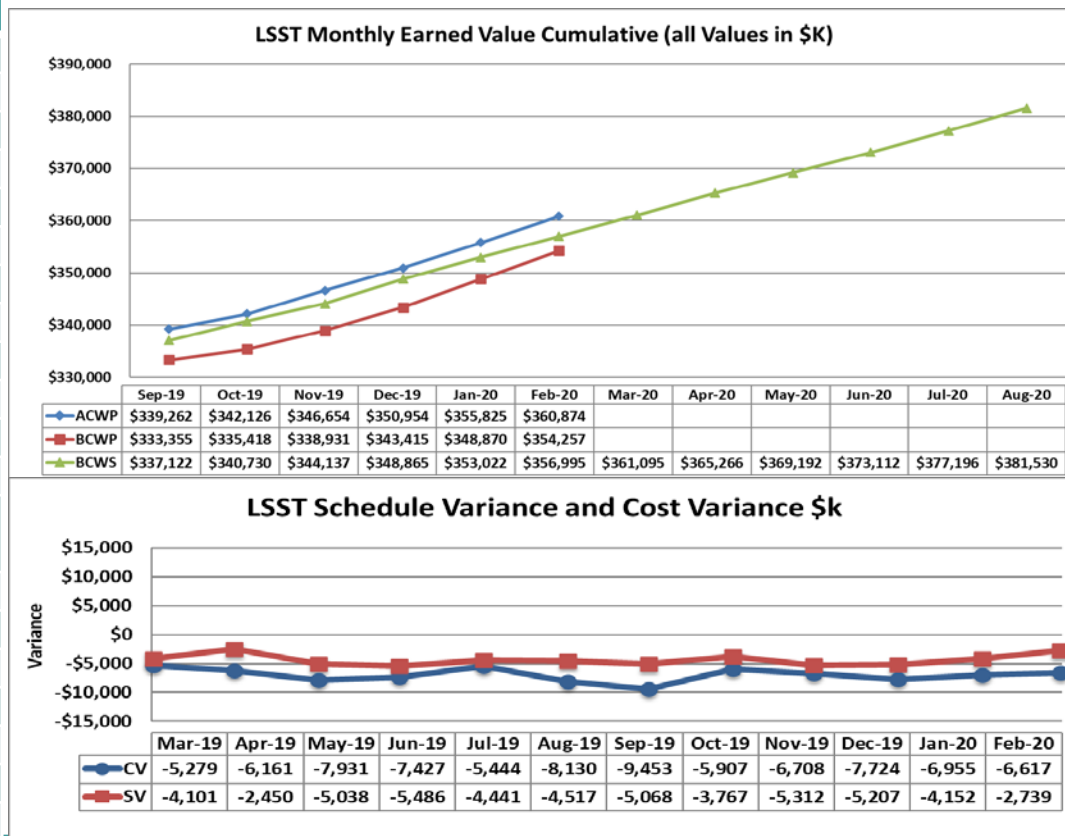


MREFC Project Status, Lvl 1 and 2; February

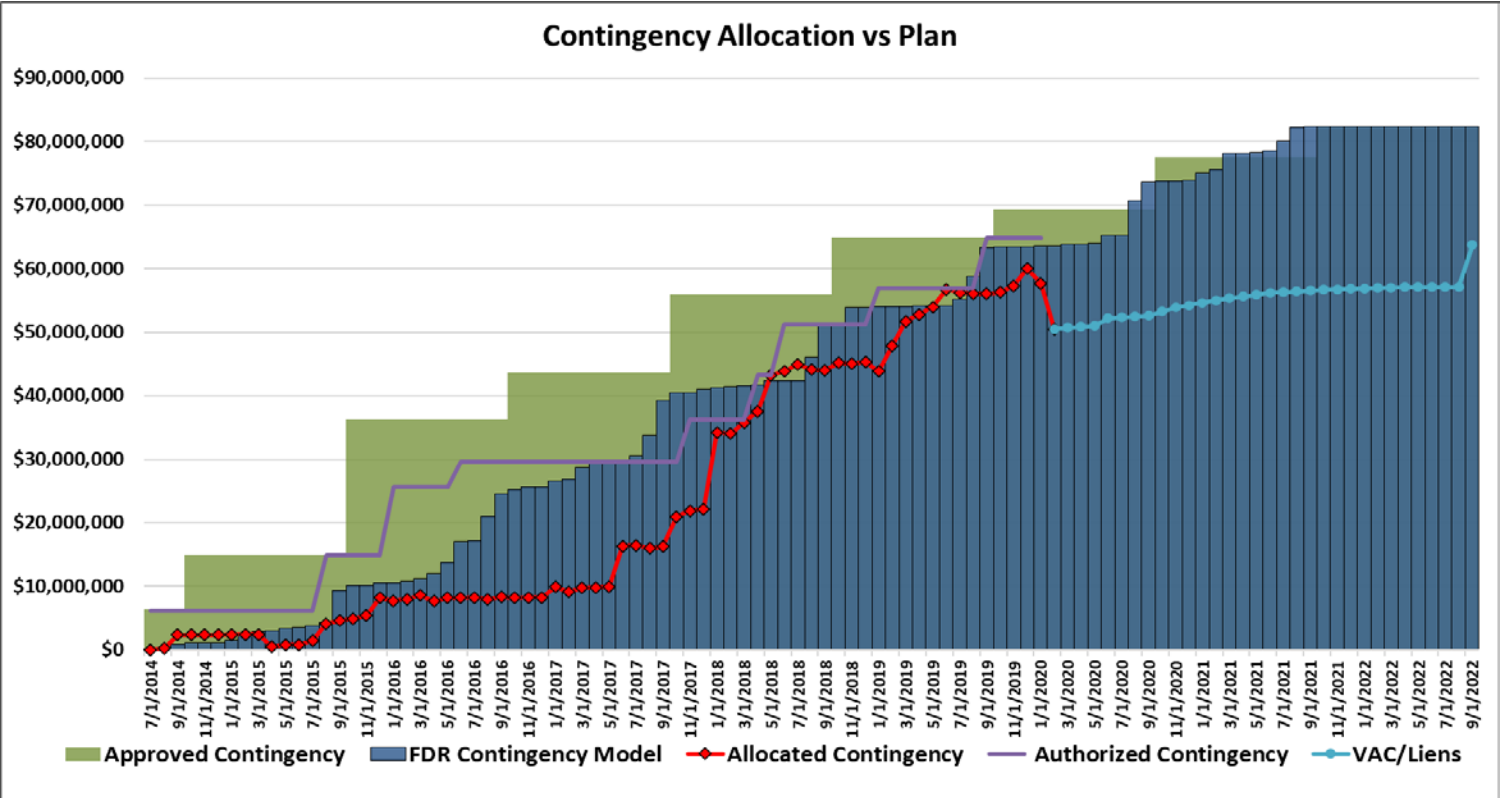
	CPR REPORT MONTH ENDING 2/29/2020 (ALL VALUES IN \$K)																			
	CURRENT PERIOD								CUMULATIVE TO DATE								AT COMPLETE			
	PLANNED	EARNED	ACTUAL	SV	CV	SPI	CPI	PLANNED	EARNED	ACTUAL	SV	CV	SPI	CPI	BAC	EAC	VAC	PCT COMP		
1 LSST Construction Baseline	3,974	5,387	5,049	1,413	338	1.36	1.07	356,995	354,257	360,874	-2,739	-6,617	0.99	0.98	439,276	445,893	-6,617	80.6 %		
1.01C Project Management Office Construction	443	445	575	2	-130	1.01	0.77	41,510	41,512	42,860	2	-1,348	1.00	0.97	50,441	51,789	-1,348	82.3 %		
1.02C Data Management Construction	1,198	3,160	3,521	1,962	-361	2.64	0.90	100,551	100,713	100,811	162	-98	1.00	1.00	139,240	139,338	-98	72.3 %		
1.04C Telescope and Site Construction	1,890	1,428	709	-462	719	0.76	2.01	198,672	196,028	201,873	-2,644	-5,844	0.99	0.97	211,889	217,733	-5,844	92.5 %		
1.05C Education and Public Outreach Construction	97	90	82	-7	8	0.93	1.10	4,958	4,825	4,736	-134	89	0.97	1.02	9,183	9,094	89	52.5 %		
1.06C Systems Engineering and Commissioning	346	264	162	-82	102	0.76	1.63	11,303	11,177	10,593	-126	584	0.99	1.06	28,523	27,939	584	39.2 %		

MREFC EVM Data Summary and Trends

		\$M
EVM Reporting Date		Feb-20
Total Project Cost (TPC - \$M) (Includes Mgmt fee)		472.5
Total Project Cost (TPCII - \$M) (No Mgmt fee)		471.2
Estimate At Completion (EACI - \$M)		445.9
Estimate At Completion Bottom Up (EACII - \$M)		452.4
Budget at Completion (BAC - \$M)		439.3
Budgeted Cost of Work Scheduled (BCWS - \$M)		357.0
Budgeted Cost of Work Performed (BCWP - \$M)		354.3
Actual Cost of Work Performed (ACWP - \$M)		360.9
Remaining Contingency		31.9
Remaining Contingency, % of ETCI		37%
Remaining Contingency, % of ETCII		35%
Remaining Contingency, % (TPCII – BAC - CV)/(EACII - ACWP)		28%
% complete	Planned	81%
	Actual	81%
% \$	Percent Spent	82%
Cost Variance (CV)		-6.6
Schedule Variance (SV)		-2.7
Actuals + Commitments (Approx.)		398.4
Cumulative NSF funding to date		400.8



Contingency Allocation Trends



Level 1 Milestones completed

Level 1 Milestone Change Tracking

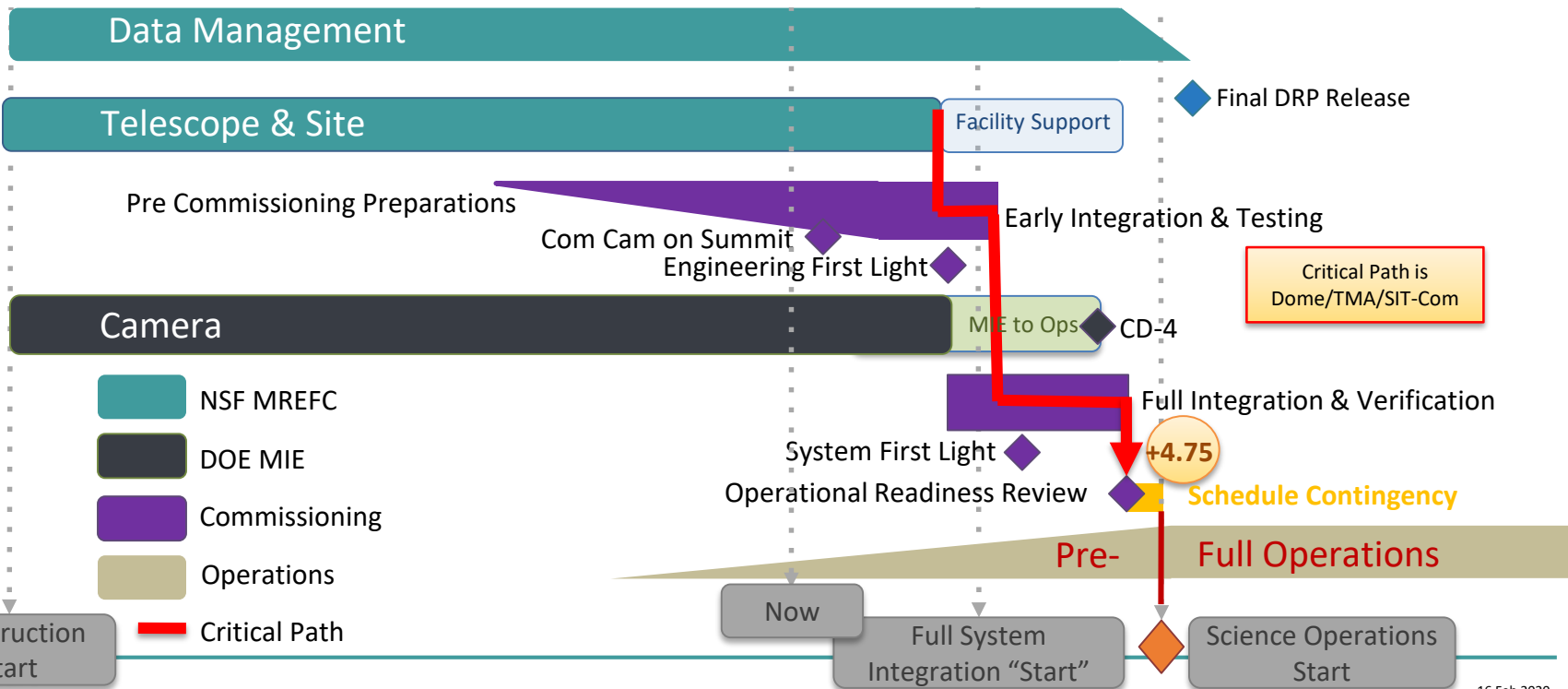
Activity Name	Baseline Finish	Previous Month Finish	Forecast / Actual Finish	Delta From Baseline	Delta From Previous Month	Total Float
Nominal Start of NSF MREFC Funding	1-Aug-14	01-Aug-14 A	01-Aug-14 A	0	0	0
Dome Contract Start	4-May-15	04-May-15 A	04-May-15 A	0	0	0
Mountain - Base Network Functional 1 Gbps	2-Jun-15	01-Jun-15 A	01-Jun-15 A	-1	0	0
Archive Site Ready for Equipment Configuration	29-Sep-15	01-Oct-15 A	01-Oct-15 A	2	0	0
OCS Scheduler Available	24-Feb-16	15-Feb-16 A	15-Feb-16 A	-7	0	0
Coating Plant Contract Start	1-Mar-16	01-Mar-16 A	01-Mar-16 A	0	0	0
Lower Enclosure Ready for Dome	5-Oct-16	14-Oct-16 A	14-Oct-16 A	7	0	0
Award Base Facility Contract	17-Jan-17	20-Mar-17 A	20-Mar-17 A	43	0	0
EPO Acceptance Review	29-Sep-17	28-Sep-17 A	28-Sep-17 A	-1	0	0
Summit Facility Full Occupancy	13-Nov-17	01-Mar-18 A	01-Mar-18 A	72	0	0
Mountain - Base Network Functional 2 x 100 Gbps	27-Mar-18	02-Apr-18 A	02-Apr-18 A	2	0	0
LSST Software Release 8.1 Complete, Ready for Commissioning Camera	31-Aug-18	12-Jul-18 A	12-Jul-18 A	-37	0	0
M2 on Site	18-Oct-18	23-Dec-18 A	23-Dec-18 A	47	0	0
ComCam Optics & Filters Ready for Integration in tucson	9-Jul-18	1-Feb-19 A	1-Feb-19 A	143	0	0
Base Center Ready for Occupancy	7-May-19	29-Mar-19 A	29-Mar-19 A	-28	0	0
M1M3 on Site	18-Jul-19	15-Jul-19 A	15-Jul-19 A	-4	0	0
LSST Software Release 9.1 Complete, Ready for Full Camera	30-Aug-19	30-Aug-19 A	30-Aug-19 A	-1	0	0
Base Center Integration Complete	13-May-20	13-May-20	28-Feb-20 A	-51	-51	0

Level 1 Milestones Remaining

Level 1 Milestone Change Tracking						
Activity Name	Baseline Finish	Previous Month Finish	Forecast / Actual Finish	Delta From Baseline	Delta From Previous Month	Total Float
Telescope Mount Fab Contract Complete	29-Oct-20	29-Oct-20	29-Oct-20	0	0	0
Archive Center Integration Complete	7-Aug-20	7-Apr-21	9-Feb-21	126	-40	156
COMP: Camera Pre-Ship Review at SLAC	19-Nov-20	17-Feb-21	5-Mar-21	70	11	10
3-Mirror Optical System Ready for Testing	1-Jun-21	1-Jun-21	1-Jun-21	0	0	7
Telescope Subsystem Development Complete	1-Apr-21	2-Jun-21	2-Jun-21	44	0	6
Engineering First Light w/ComCam	7-Jul-21	7-Jul-21	7-Jul-21	0	0	32
Camera Ready for I&T at Summit Facility	30-Apr-21	22-Jul-21	6-Aug-21	70	11	29
System First Light	6-Dec-21	6-Dec-21	6-Dec-21	0	0	108
System Integration Test Complete	6-Dec-21	6-Dec-21	6-Dec-21	0	0	108
Science Verification Complete	6-May-22	6-May-22	6-May-22	0	0	0
Start of Full Science Operations	3-Oct-22	3-Oct-22	3-Oct-22	0	0	0

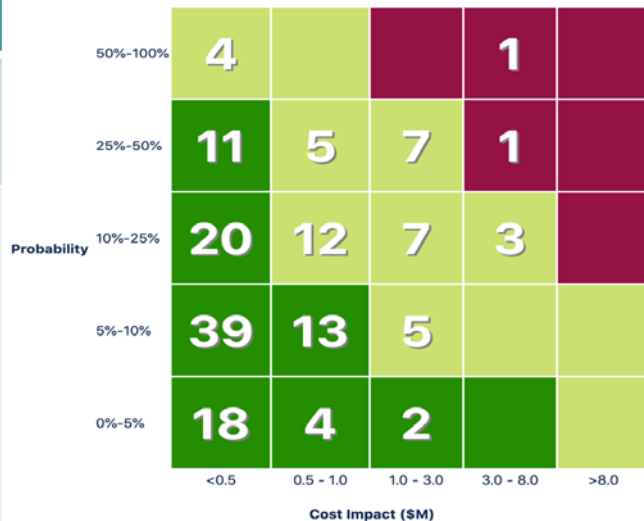
LSST Schedule – 4.75 Months Contingency (Pre-COVID)

CY2014				CY2015				CY2016				CY2017				CY2018				CY2019				CY2020				CY2021				CY2022				CY2023				CY2024			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4
FY2014				FY2015				FY2016				FY2017				FY2018				FY2019				FY2020				FY2021				FY2022				FY2023				FY2024			
Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4	Q1	Q2	Q3	Q4



Risk Management Process with New Jira Tool Functioning well

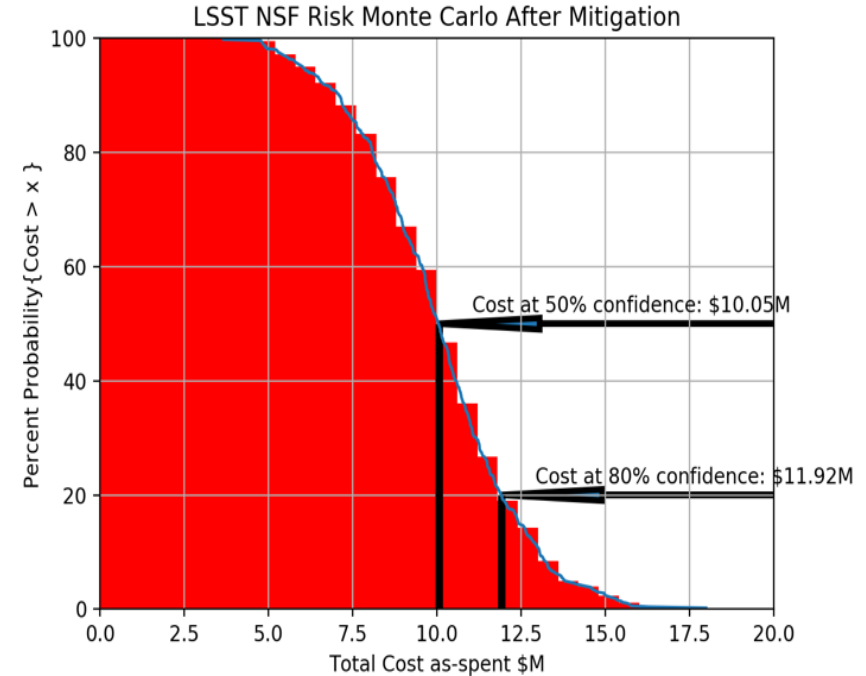
Risk ID (Parent)	Subsystem	Summary	PWE (\$K)	PWE After Mitigation (\$K)	Proposed Management Response
RM-886	Project Management Office	Subsystem Milestone Execution	3717	3717	Schedule and contingency will be used along with reworking the integrated plan to deal with subsystem delays
RM-888	Project Management Office	Multi-agency coordination - Camera Delivery	1332	135	At this time the NSF and DOE efforts are on the critical path. ComCam reduces the direct dependency of late Camera delivery but with an 80% confidence of delivery within 5 months of due date this risk covers the residual impact of the camera being later that ComCam can stay efficient.



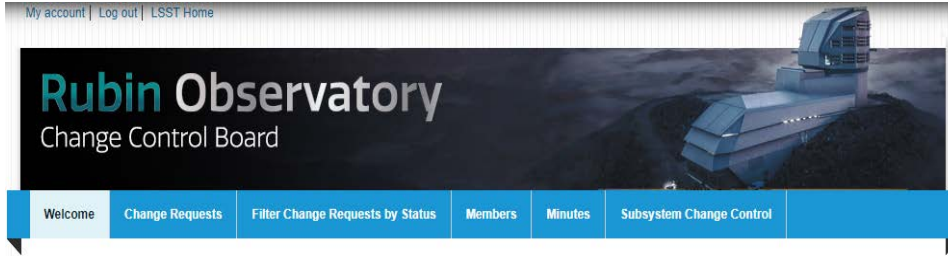
Risk Management

New Tool offers Monte Carlo Analysis of Risks

- 163 Active Risks and 12 Opportunities
- Probability Weighted Cost Exposure (PWCE):
 - Current: \$26.22M
 - After Mitigation: \$10.01M
- Monte Carlo Analysis:
 - 80% Confidence = \$11.92M
 - 90% Confidence = \$13.05M



Rubin Change Control Process

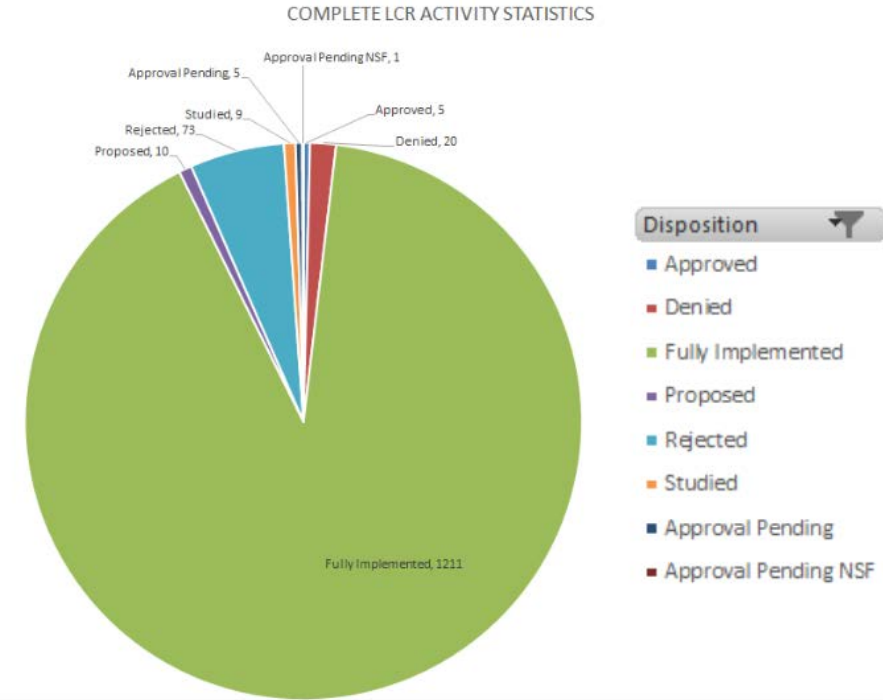


-LCR Process is Active

- Baseline / Non-conformance
- EVMS / DOE-Commissioning
- Ranpal Gill / Rob McKercher
- Weekly / Monthly meetings

-Processing estimates to complete for a controlled EAC

-CCB is key for documentation and Operations interface
(Ops Dir on CCB)

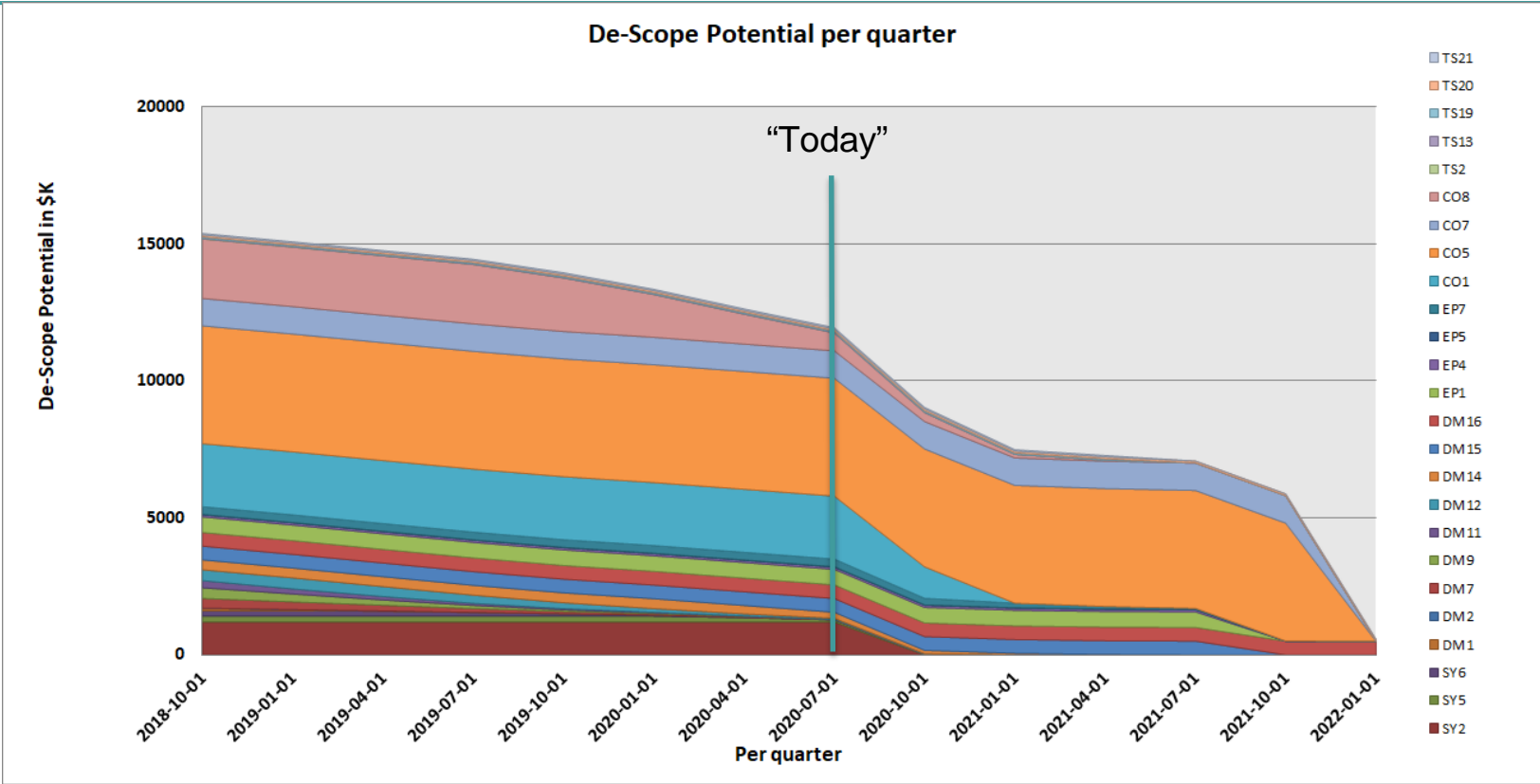


Scope Options (LPM-72)

- Rubin has 25 Scope Options for total current value (1 July 2020) of \$12M
- Four items are \$1.0M or more and total ~\$8.8M
- Significant performance and validation impact in remaining scope items.

ID	Title	2020-07-01 (k)
CO5	Eliminate Both Science Validation Surveys	4300
CO1	Eliminate Early System AI&T with ComCam	2300
SY2	Reduce System Process and Storage to SRD Minimum Specifications	1200
CO7	Eliminate SV Survey for Data Release Processing	1000

De-Scope Potential per Quarter (LPM-72)



- Project was in full swing and projections were positive
 - Subsystem Status will emphasize excellent progress
- Challenges were, and still are, being managed
 - Camera, Telescope and Dome development are tight critical path but schedule contingency restored
 - Operations interactions for Transitions, Data Facility and Hardware on good path for Construction
- Team has responded well to COVID-19 issues and shutdown
 - Good virtual engagement and productivity demonstrated from home
 - Summit team has shown great fortitude
 - Safety teams and Project fully committed to Exposure Prevention
- We are ready to restart, rebaseline, and succeed

May 5, 2020 @ 8pm



https://public.earthcam.net/lsst/summit_facility/camera_1/view_1