LSST Director’s Report
Steven M. Kahn
LSST Director

April 13, 2016
Program to Date Accomplishments

- Intense activity in every part of the project. EPO is just ramping up.
- Work being performed across the globe; USA, Italy, Germany, France, Spain, United Kingdom, Chile, Brazil, Japan and more with sub-suppliers.
- Activity in every part of the project range from detailed design, final fabrication, coding, and subsystem deliveries. Administration, System Engineering and Project Management across project is fully engaged.
- Assembled excellent teams across the project.
- LSST has an exquisite safety record.
Financial Accomplishments:
- LSST has completed $135M (NSF & DOE) in construction work through February 2016.
- NSF MREFC is 19% complete and has 23% contingency on remaining work; Schedule Performance Index = 0.94, Cost Performance Index = 1.08.
- DOE Camera has formal CD-3 approval, is 43% complete and has 32% contingency on remaining work.
- The Project critical path has 13 months of contingency to scheduled start of full survey operations in October 2022.

Fiscal Year 2016 Plans
- 2016 is highest budget year for NSF ($99.7M) and the second highest year for DOE ($40.8M).
Passage of the Omnibus Bill in December Keeps Project On Track

NSF:

“Via a House proposal, provide $99.7 million for the Large Synoptic Survey Telescope, which promises to provide an ultra-wide field image of the universe;”

DOE:

“Provide $10.3 million for the Dark Energy Spectroscopic Instrument, $10.5 million for the G2 Dark Matter Experiment LUX ZEPLIN at Lawrence Berkeley Laboratory, and $40.8 million for the Large Synoptic Survey Telescope camera;”

Both values are in line with our expected funding levels for FY16!

The President’s Budget Request for both agencies in FY17 is also commensurate with our planned funding levels.
Layout of the Summit Facility

Base Facility:
Supports Operations
Data Access Center
January 8, 2016
Excavation for lower enclosure foundation

Excavation for telescope pier foundation - rebar placed for pour Feb 22 to 24

Provisional plywood walkways

Excavation for platform lift

Service building concrete structure in progress

Material staging

Formwork for beams to support level 3 floor & mirror cart rails

February 15, 2016
Telescope and Site Progress: Concrete Pour
Telescope and Site Progress: TMA Moving Forward
Telescope and Site Progress: M1/M3 and M2 Mirror Cells in Development
Telescope and Site Progress: Coating Plant Vendor Selected

- Successful meeting with Von Ardenne GmbH in Dresden, Germany

**LSST MAGNETRON & SHUTTER**

- 8 magnetrons, each on a separate support shaft (caused by magnetron overlap)
- magnetrons with vacuum sealed boxes with connection to atmosphere
  - boxes include valves, cooling, gauges, moving parts etc.
Telescope and Site Progress: Design of Base Facility Construction
Camera Progress: Science Raft

- Qualification of the first-article silicon-carbide raft sensor assembly (RSA) baseplates was completed.
- IN2P3 tested and sent 128 validated production Analog Signal Processing Integrated Circuits.
- SLAC received 5 assembled Science Raft Electronic Boards and testing is underway. Initial results indicate the REBs are acceptable for vacuum and particulates.
Camera Progress: Science Raft

- **RSA Warm/Cold Metrology (TS5)** was fully assembled in February and is now performing warm metrology. The Cryostat is now complete and under vacuum.
  - Full system commissioning (warm & cold) will be conducted throughout April.

- Most of the parts have been received for the RTM EO Test Camera #1
- The Test Stand is now being assembled and will begin integrated testing in early April after the DAQ & CCS teams perform DAQ installation from 3/28 – 4/1
Camera Progress: Optics

- L1-L2 subcontractor Vanguard held successful optics manufacturing readiness reviews (MRRs) in February ahead of schedule and production of the structure has started.

- Filters MRR was successfully completed on February 16 at LLNL.

- The team released an RFP for Broadband Anti-Reflection (BBAR) coating in late February and plans to award a BBAR contract by late June.

- The L3 vendor is completing the final design and analysis. The NASTRAN FEA model was received from the vendor, and an independent review and analysis was performed by a LLNL project analyst.

- Award placed with Corning for five filter blanks

- The award contract documents for the Filter Fabrication was finalized in February and sent to the vendor in early March.

- The Filter coating contract Source Selection Committee and buying team selected the vendor and an award is anticipated by April.
Camera Progress: Optics

L2 Blank on the 5 Axis

Loading the L2 Blank with AOS vacuum Lift

The AOS Scale Bar in the CMM
Camera Progress: Cryostat Grid Fabrication

Halves of the production grid after mating and bonding

A grid cell, showing the bond line between halves after cleaning

Green-body grid is carefully aligned, and silicon is placed around it

Skirt attached and filled with silicon chips

Grid undergoes silicon infiltration in a 1100°C furnace for several days.

Grid after silicon infiltration. The next steps are surface-finishing and final machining.
Data Management Software In Use

HSC rly-multiband image processed by Lauren MacArthur with LSST stack

Francisco Forster
High Cadence Transient Survey DECam images
Subtracted with LSST Stack
Mitigating Risk: Contingency Schedule

- **Data Management**
  - Release v9.1
  - +10

- **Telescope & Site**
  - Early Integration & Testing
  - +2

- **Camera**
  - Full Integration & Testing
  - Science Verification Complete
  - +13

- **Timeline**
  - Construction Start
  - Now
  - Commissioning Start
  - Science Operations Start

**FY Years**
- FY 2014
- FY 2015
- FY 2016
- FY 2017
- FY 2018
- FY 2019
- FY 2020
- FY 2021
- FY 2022
- FY 2023
- FY 2024

**Quarters**
- Q1
- Q2
- Q3
- Q4
Summary

- The Project is in good shape programmatically. The risks associated with delays due to approvals, funding, etc have all been retired.

- We are in the thick of construction. We are transitioning from R&D into building real hardware and software. That is a cultural change that is being felt all over the Project.

- The team has grown substantially in size. There are the usual tensions one can expect for big projects, but we are working through them.

- A lot of our attention is now focused on commissioning and operations.