Status Update

Astronomy & Astrophysics Advisory Committee

26 September 2017

Nigel Sharp

LSST Program Officer, MPS/AST

Overview

- **Technical progress is excellent, although the Project team is very busy.**
- **Status by the numbers is good.**
- **Although both cost and schedule contingency are tight, construction is on track to complete on time and within budget.**
- **Challenges and risks remain.**

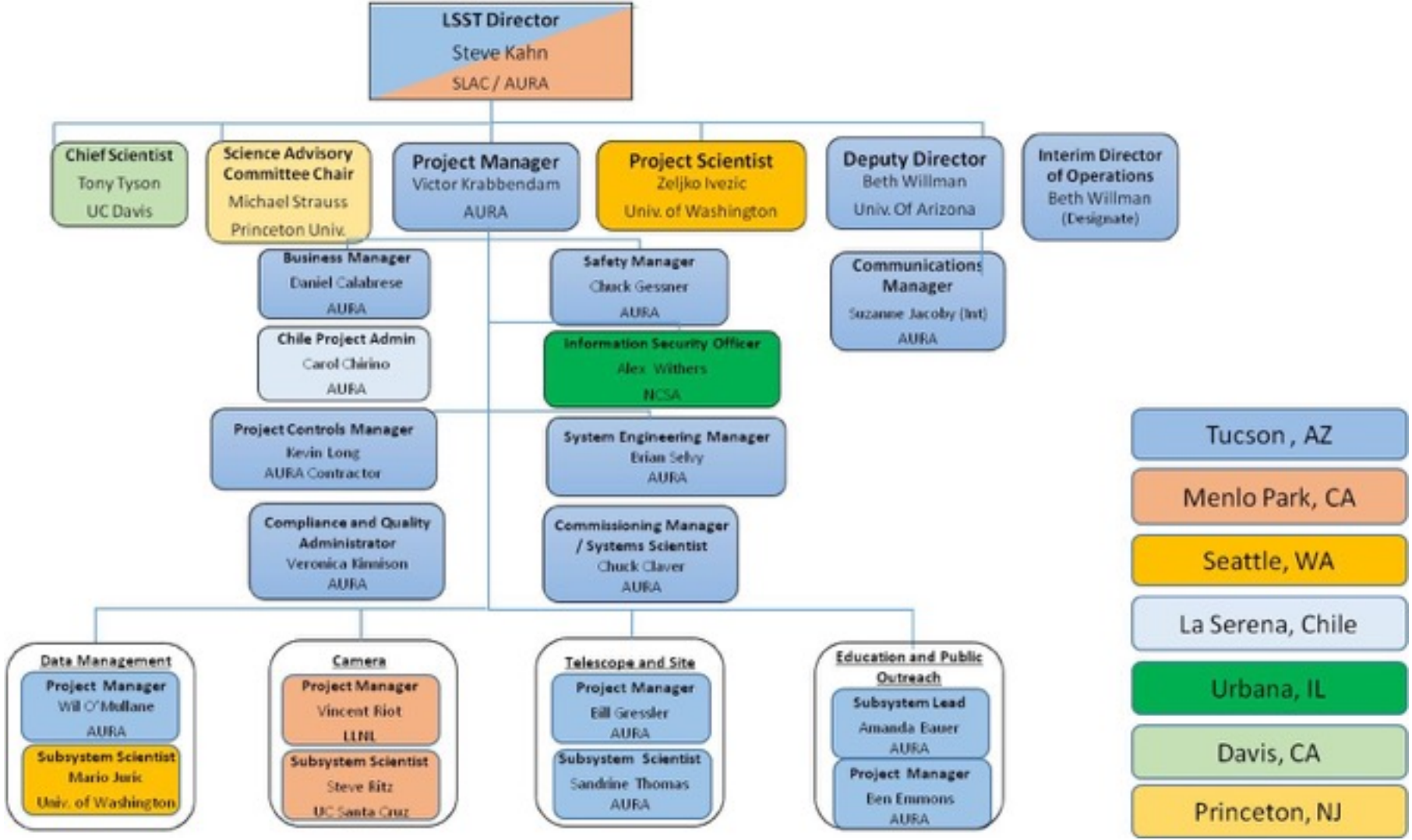
Joint NSF-DOE annual progress review (September 6-8):

The Committee finds that an enormous amount of work has been accomplished and the progress is impressive. It is very exciting to see the project advance.

The project has put together an excellent team of people and the many project participants and organizations are functioning well as a single team.

LSST has robust management processes, and they appear to be ready for the significant challenges that lie ahead.

The overall consensus of the Committee is that the project is going very well.


LSST Director
Steve Kahn
SLAC / AURA
Chief Scientist
Tony Tyson
UC Davis
Science Advisory Committee Chair
Michael Strauss
Princeton Univ.
Project Manager
Victor Krabbendam
AURA
Project Scientist
Zeljko Ivezic
Univ. of Washington
Deputy Director
Beth Willman
Univ. Of Arizona
Interim Director of Operations
Beth Willman
(Designate)
Business Manager
Daniel Calabrese
AURA
Chile Project Admin
Carol Chirino
AURA
Safety Manager
Chuck Gessner
AURA
Information Security Officer
Alex Withers
NCSA
Communications Manager
Suzanne Jacoby (Int)
AURA
Project Controls Manager
Kevin Long
AURA Contractor
Compliance and Quality Administrator
Veronica Kinnison
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System Engineering Manager
Brian Selvy
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Commissioning Manager / Systems Scientist
Chuck Claver
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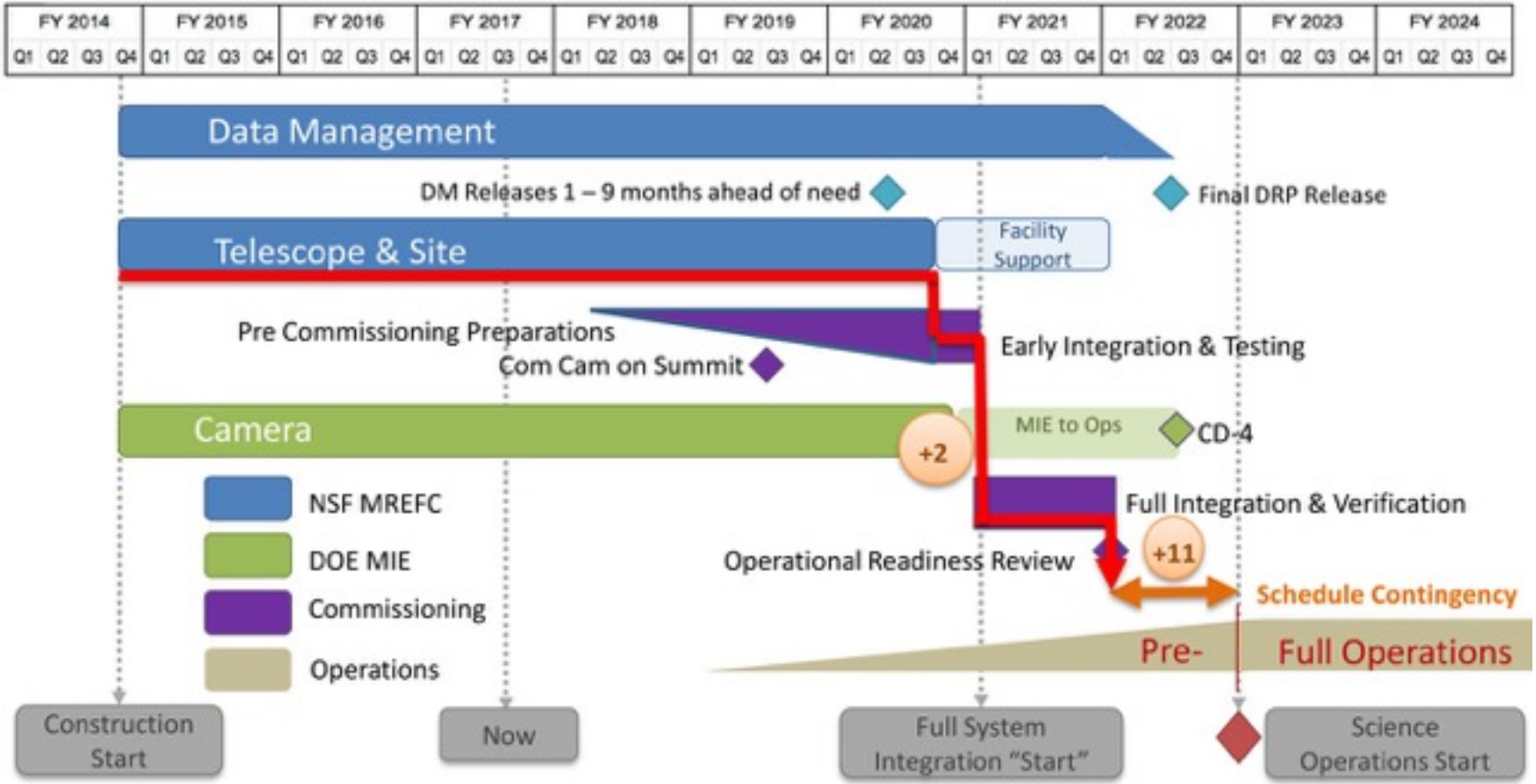
Data Management
Project Manager
Wil O'Mullane
AURA
Subsystem Scientist
Mario Juric
Univ. of Washington
Camera
Project Manager
Vincent Riot
LLNL
Subsystem Scientist
Steve Bitz
UC Santa Cruz
Telescope and Site
Project Manager
Bill Gressler
AURA
Subsystem Scientist
Sandrine Thomas
AURA
Education and Public Outreach
Subsystem Lead
Amanda Bauer
AURA
Project Manager
Ben Emmons
AURA
Tucson , AZ
Menlo Park, CA
Seattle, WA
La Serena, Chile
Urbana, IL
Davis, CA
Princeton, NJ

Schedule Overview



Building and Site

Building and Site

The weather has been terrible – rain brought down rocks and blocked the road.

Building and Site

Building and Site

Then it snowed …

Building and Site

But if we look at December 2016

Building and Site

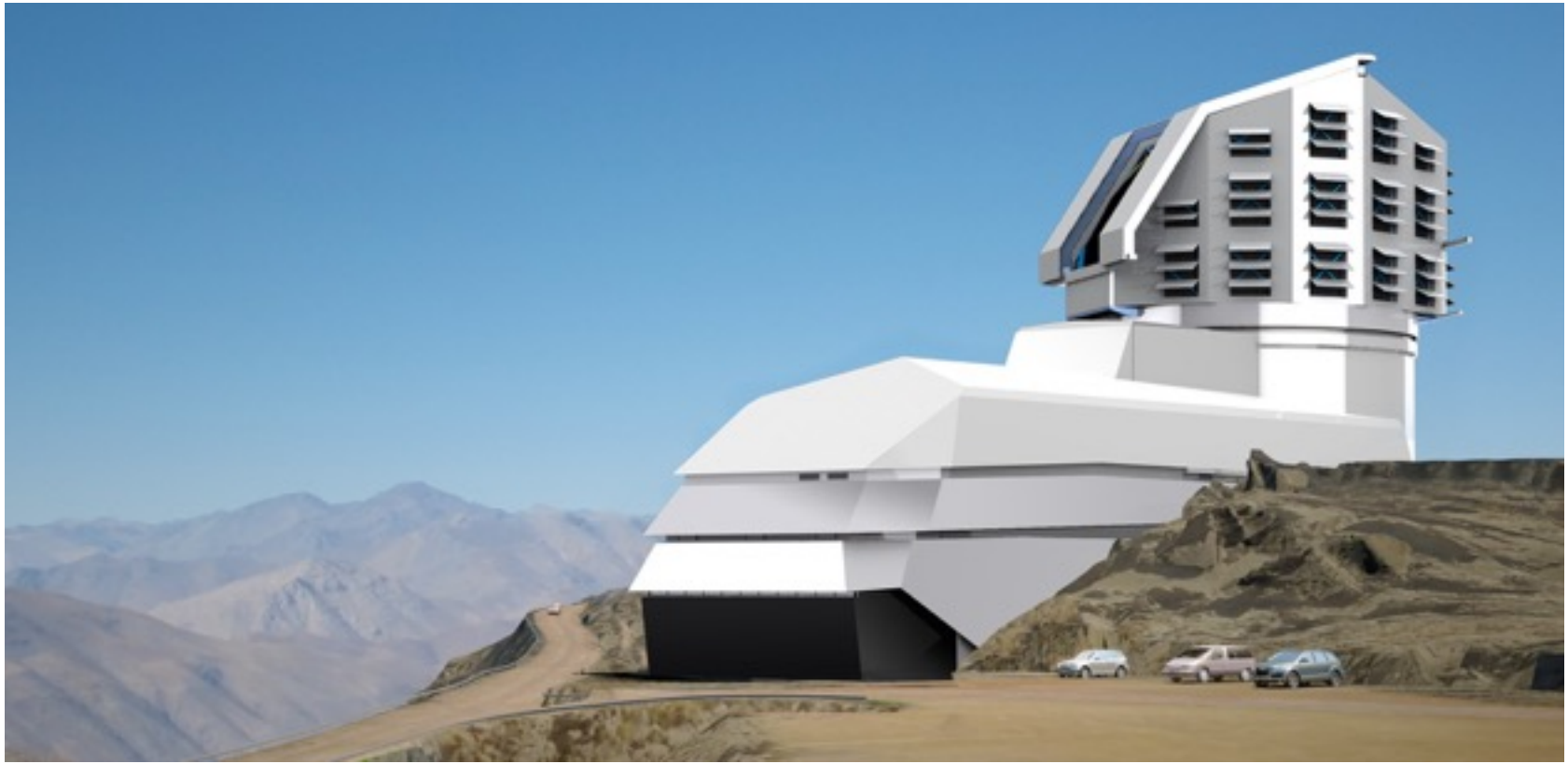
Building and Site

and then at August 2017

Building and Site

Building and Site

It begins to look a lot like the artist's impression

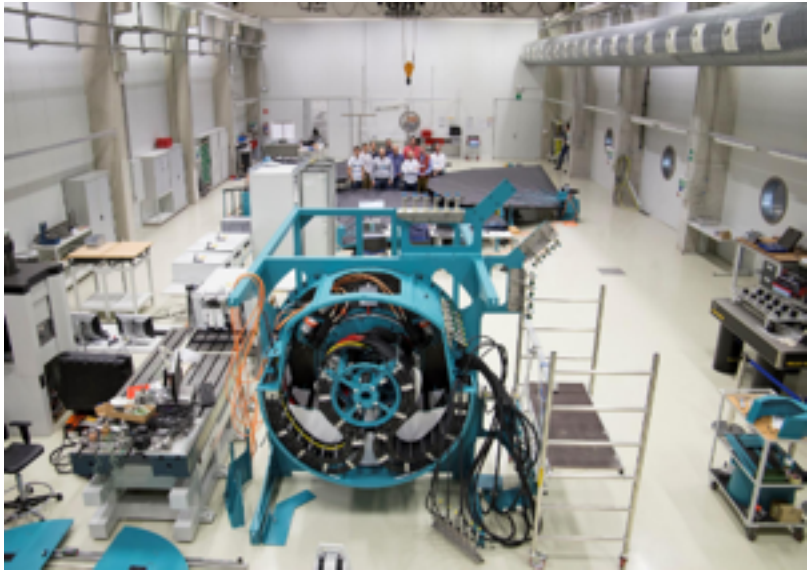


Building and Site

It's beginning to look a lot like the artist's impression.

Telescope Mount Assembly

- Shipment to summit in Summer 2018



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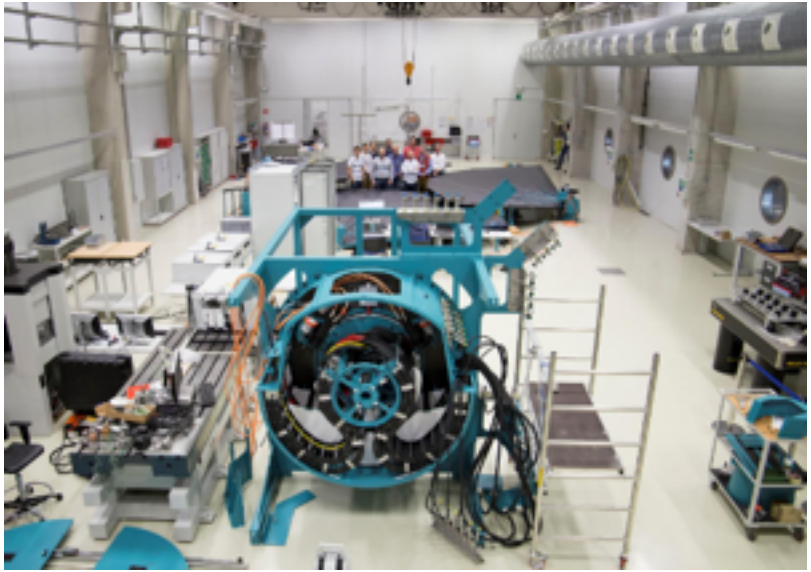

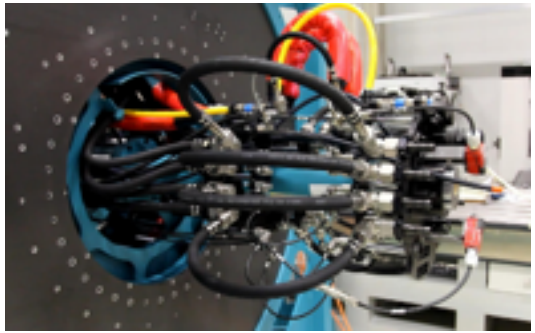

M1M3 Mirror Cell & Surrogate

Cell with >4400 machined deck plate holes

Surrogate mirror machined & ready

Support systems under test

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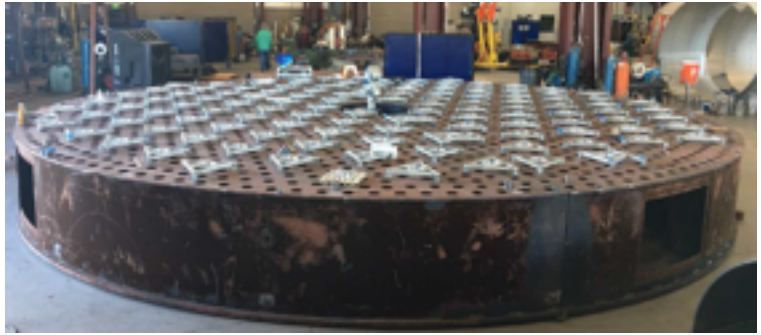

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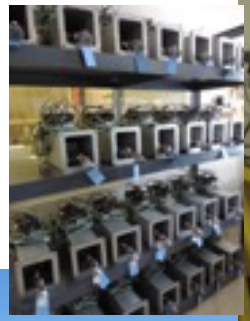
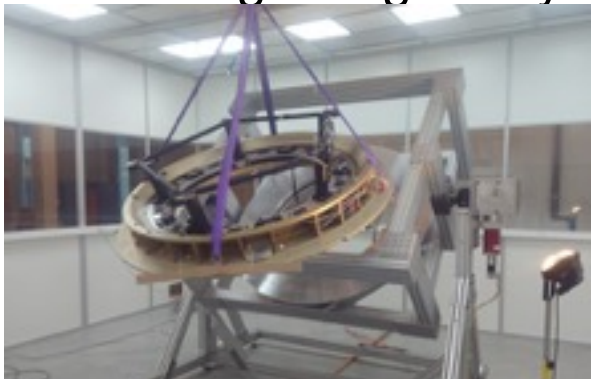


Data Management

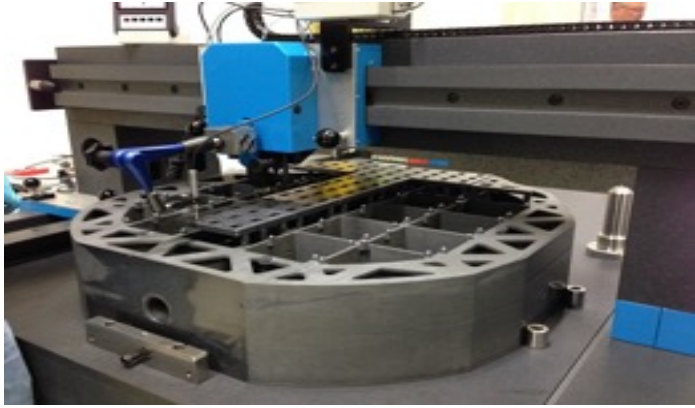
- **New Project Manager fully in place**
- **Re-plan completed – budget approval pending**
  - Contingency usage needed; subsystem cost up by 13% from beginning
  - Really does look like the major “hit” has been handled
  - Aligns the plan now, when there is still time to succeed
  - Current activities are consistent with re-plan (nothing radical)
- **New management structures in place; focus on new PM and**
  - Individual software product ownership
  - Empowering newly defined DM science team
  - Verification and Validation
- **External review in July**
  - Very supportive but, as always, made some recommendations

Camera Status

Overall coming along nicely



Filter exchange system prototype



Support grid

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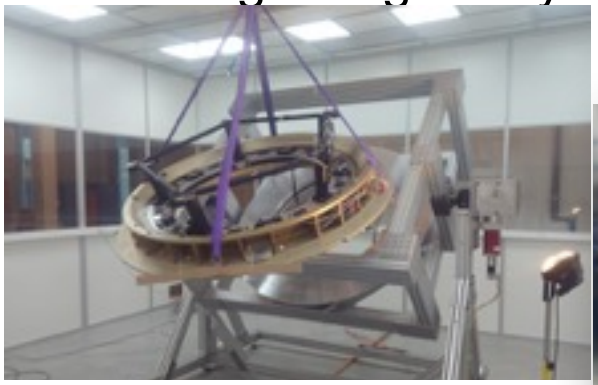

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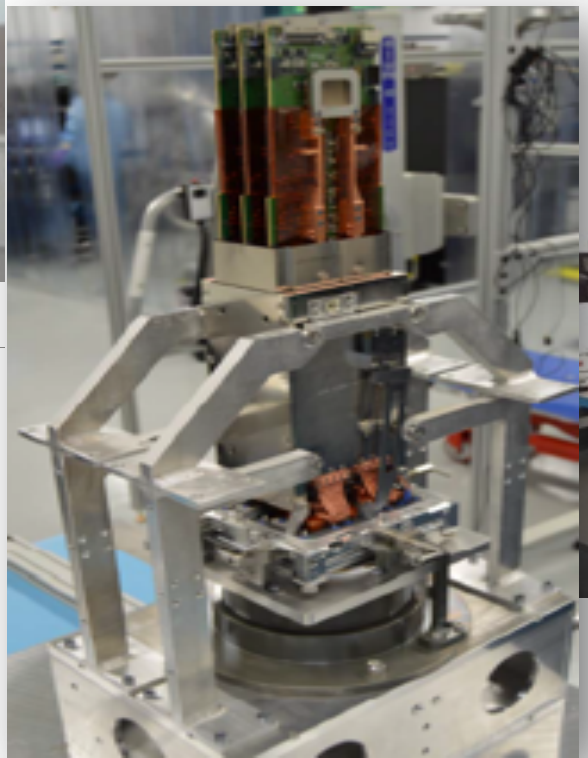

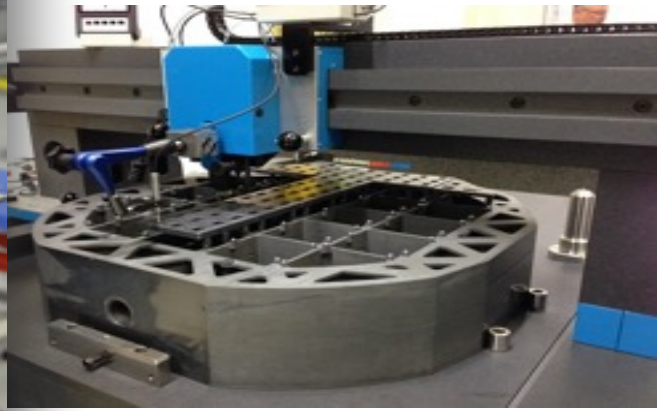

Support grid

RTM 2

Camera Status

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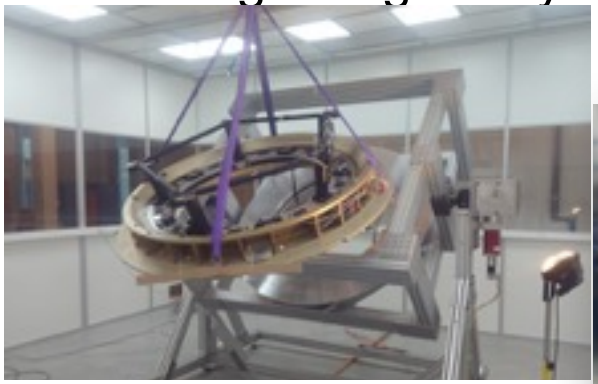
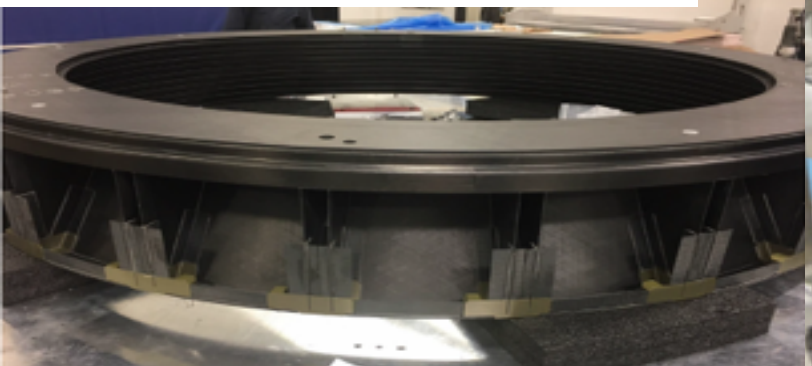
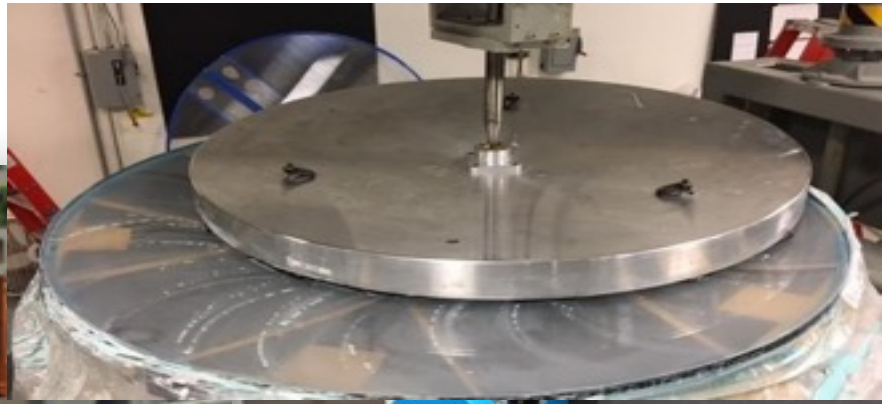


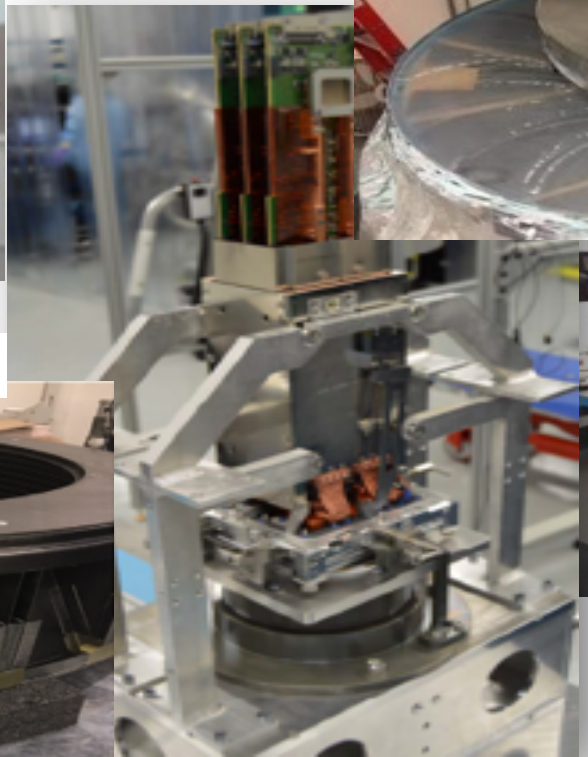
Filter exchange system prototype

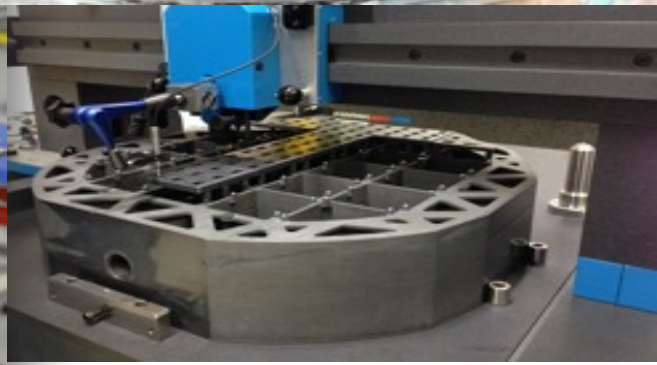
L1 & L2 support



L1 (1.6m)







Support grid

RTM 2

But there are always problems

- Top tracked risks are all related to system commissioning
- Telescope and site now the critical path
  - 6.5 month delay – overall, 2.5 months of project schedule contingency used
  - M1M3 design/fabrication underestimated, but preparing for integration
- Software development risks addressed - new manager, additional staff
- Camera is two months off critical path but worrisome
  - Sensor mitigation decisions have overall impact
  - Additional fabrication challenges with optics
  - Integration and test relies on Camera delivery
- Staffing worries exacerbated by stress and anxiety
  - Operations transition, and possible moves to Chile
- Agency interactions – annual review said Project is over-reviewed
  - Changes to NSF requirements and guidelines

Biggest next challenge for agencies is the operations proposal, submitted in August and scheduled for initial programmatic review in December

Camera problems

Camera PM situation finally resolved

Two vendors continue to produce sensors within specification, but not quickly enough

Yield issues might be resolved without being understood (not good)

Cryogenics requiring more in-house effort than originally planned, and expertise is hard to get

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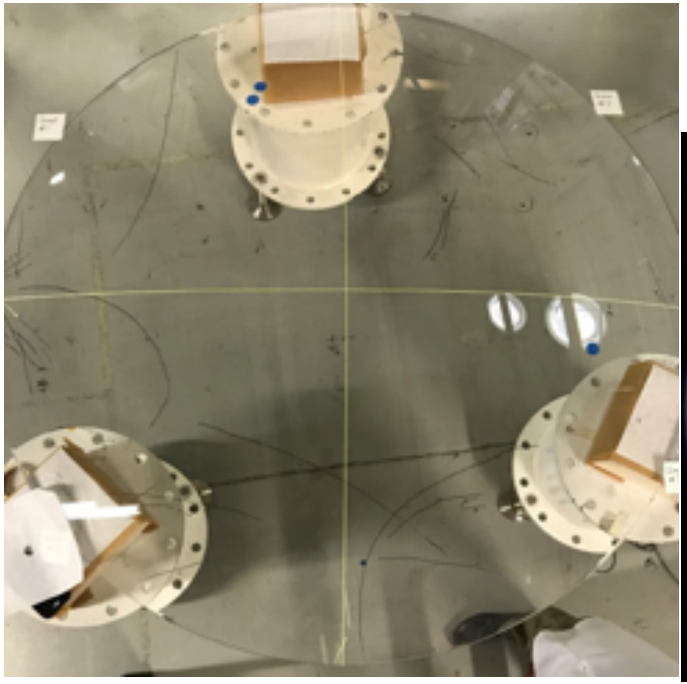
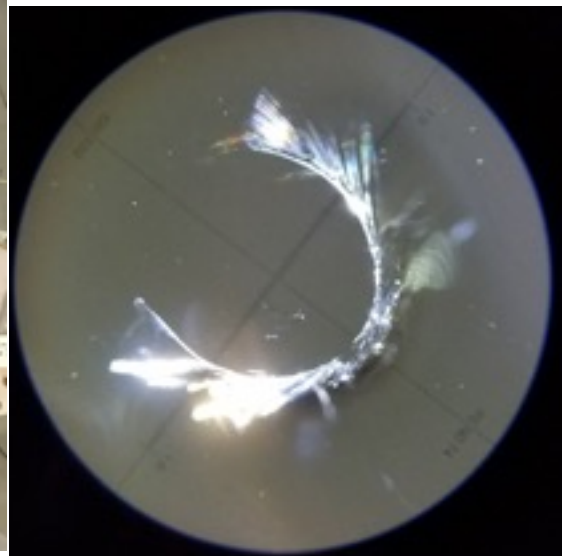
Continued small optics problems



Will polish out and be masked with negligible technical or science impact, but … *why?*



Scratches on L1, and one small fracture -1.5x1.2mm, 0.5mm deep

Site Visit

- September 20-22 – short but intense – Nigel Sharp, Ed Ajhar, Donna O'Malley
- Mountain tour; there's nothing quite like seeing it in reality
- Rebuilding of Recinto area in La Serena.
  - Offices, data & computer center, remote operations center for LSST
  - Integrated with NOAO-S, CTIO and AURA
  - First significant work since Gemini building
  - Some parts more than 40 years old.

CAS | Association of Universities for Research in Astronomy Central Administrative Services | AURA

- Discussions with administrative staff – procedures, shipping, tracking
- Importation into Chile, property tagging, inventory control

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It got to be quite wearing on us

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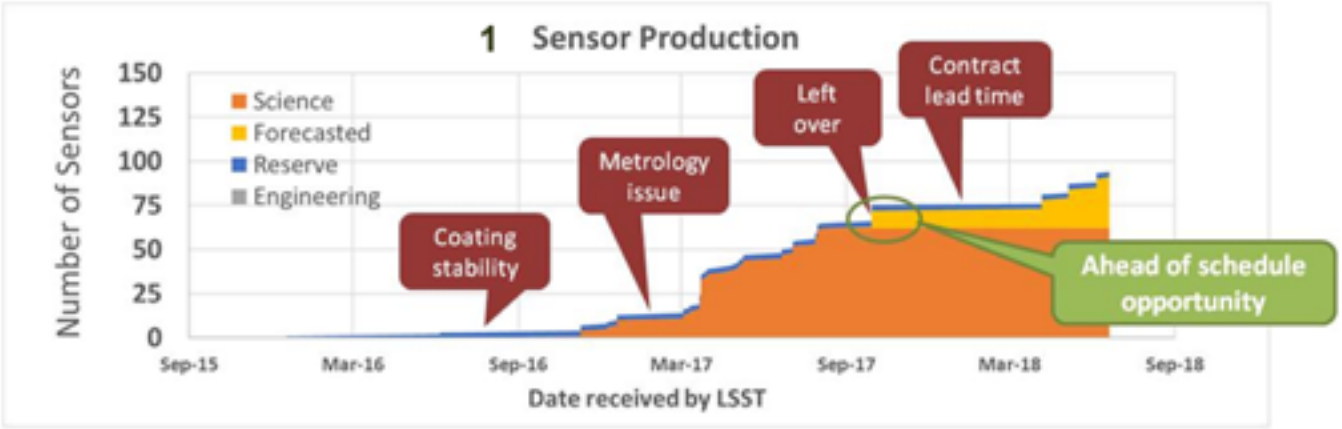
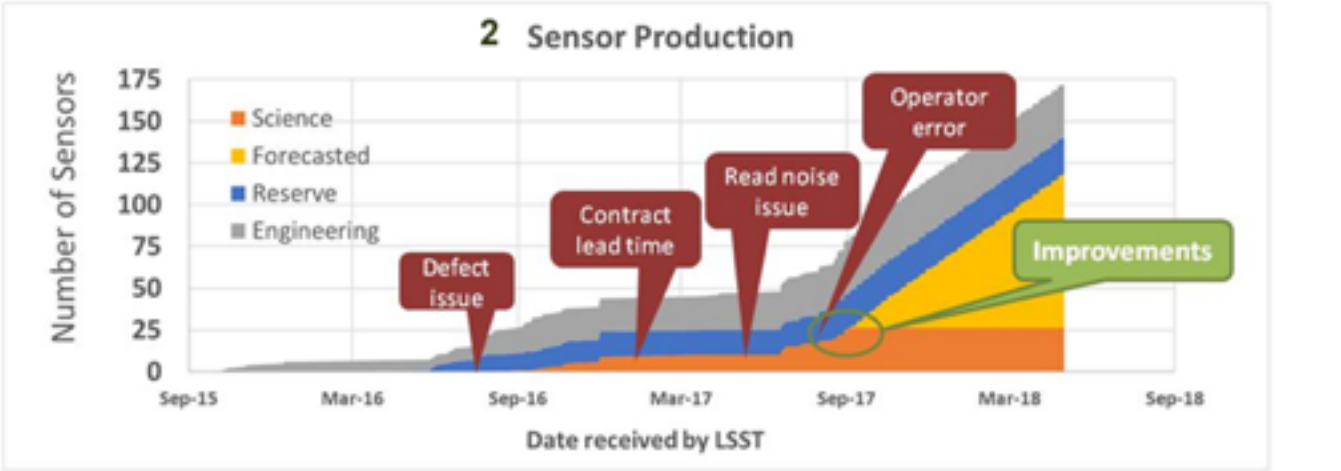
Any Questions?

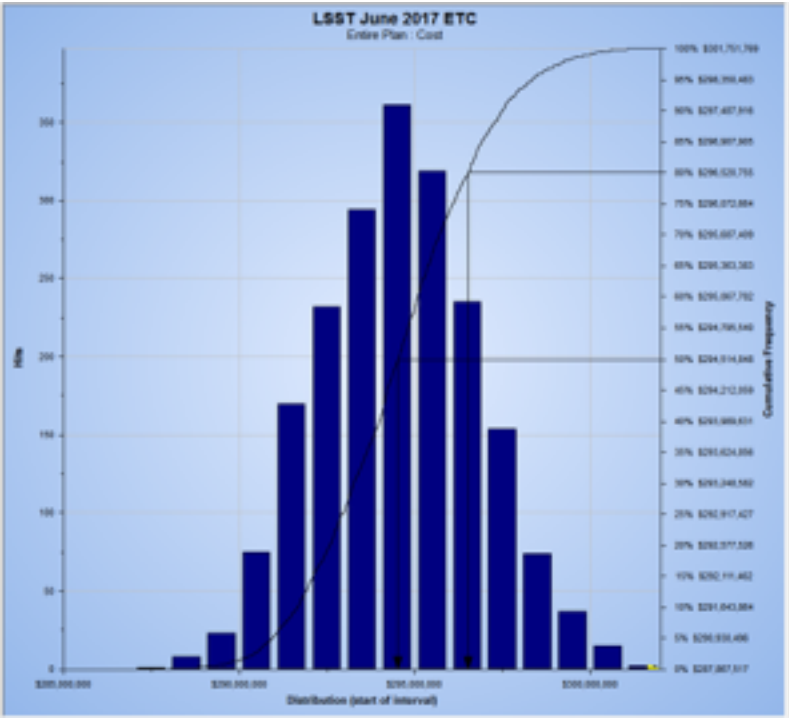
Backup Slides

Sensor delivery schedule summary

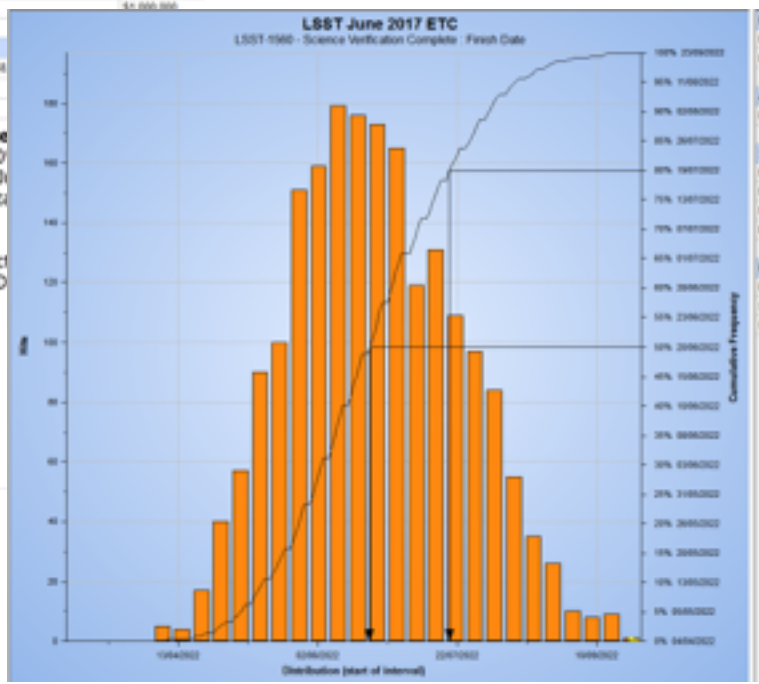




Revised Monte Carlo analysis

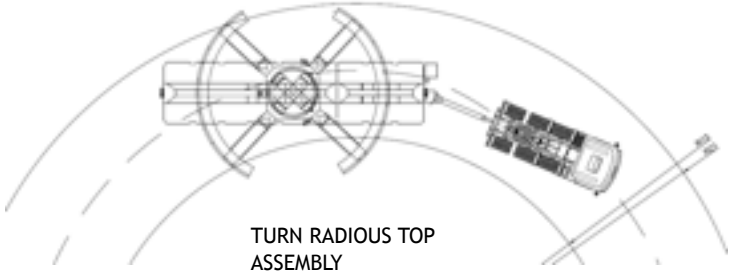


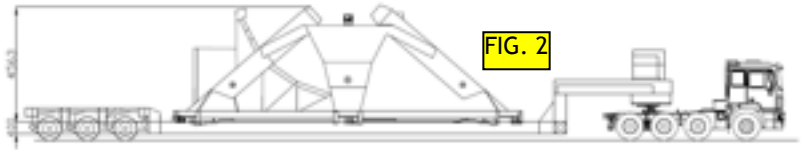
90% confidence – $64M remaining contingency is sufficient – 90% completion date 2022-08-02

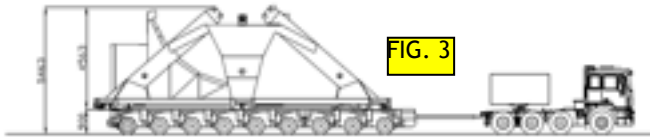


Detailed plan for timely shipment to summit

- **Hired Principal Surveyor Marine Transportation**
  - Working with vendors to optimize shipping
  - Coordinating AURA/Chilean planning







Telescope and Site Global Activity