Transition to Operations
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LSST Commissioning Plan Review
January 24-26, 2017
The Operations Proposal will be submitted to the NSF and DOE in Summer 2017.

Expected start of NSF, DOE and LSSTC operations funding is FY 2019.
The LSST System to Operate

- 8.4m Telescope
- 3.2Gpix Camera

Peta-scale Data Management

Science and EPO user Interfaces
Requirements Flowdown to Operations Plans

- LSST Data Products Definition
  - LSE-163 (DPDD)

- Technological Trends
  - Literature and Expert Input

- DM Design Documents and UML
  - LDM-148, -151, -152, -135, -129

- LSST Science Requirements
  - LPM-17 (SRD)

- LSST System Requirements
  - LSE-29 (LSR)

- Observatory System Spec.
  - LSE-30 (OSS)

- DM System Requirements
  - LSE-61 (DMSR)

- Community Input
  - LSST Science Collaborations

- LSST Universe Model
  - Version Controlled Database

- Prototyping Process
  - Data Challenges

- Logical UML Model
  - LDM-134

- Source Code
  - Version Controlled Repository (git)

- (*) LSE-nnn, LPM-nnn, LDM-nnn, etc., are internal handles uniquely identifying LSST documents under change control.
Requirements Flow Down to Operational Functions
LSST Needs to Operate as an Integrated System
Four Core Departments in Operations

Meeting LSST’s operational requirements will require the successful delivery, operation, and integration of four components:

(i) an 8.4m (6.7m effective aperture) optical telescope with a 3.5-degree diameter field-of-view and a 3.2 billion pixel camera [Observatory Operations]

(ii) a data system that will process, archive, and distribute survey images, associated transient alerts, and calibrated catalogs, as well as calibration and other metadata [Data Products Production]

(iii) a science assurance system that monitors, supports, and responds to survey progress and science products. [Science Operations]

(iv) educational portals to LSST data products through interfaces, tools, and educational experiences directed toward a broad community of non-specialists. [Education and Public Outreach]

These four departments will be operated as an integrated system
Functional Organizational Structure

- LSST Operations Office
  - Level 1 WBS
    - LSST Directors
    - Compliance
      - Level 2 WBS
        - Observatory Operations
          - Head of Observatory Operations
          - Observatory Science Oversight
          - Observatory ITC
          - Summit Operations
          - Systems Optimization and Monitoring
          - Facilities
        - Data Products Processing
          - Head of Data Products Processing
          - DPP- Offered Services
          - Reusable Production Services
          - Data, Compute & IT Security Services
          - DPP Service Software
          - ITC and Facilities
        - Science Operations
          - Head of Science Operations
          - Survey Performance and Monitoring
          - Community Support
          - Science Products, Pipelines, & Algorithms
          - DPP Service Software
        - Education and Public Outreach
          - Head of EPO/Comm
          - EPO Technical Services
          - Community Support
          - Education
          - EPO Support
        - Business Operations
          - Business Operations Manager
          - Contract Management
          - Staff Support Services
          - Business IT & System Integrity
          - Human Resources

LSST Operations Review
November 2016
Operations partners are those institutions with the resource depth and agreed institutional commitment to execute the LSST mission with ongoing operational support and personnel.

The operations partners are LSST/AURA centers (also representing sub-contracted affiliates), DOE Labs represented by SLAC, and NCSA.
The Operations Planning team has done a bottom-up estimate of FTEs needed to deliver on operational activities during steady state operations.

We have also considered what activities are needed to ramp up to operations, and developed staffing profiles from FY19 - FY34.
The Pre-Operations Phase

A pre-operations phase will take place from FY19 - FY22, in parallel with commissioning. This is a ramp up period, in advance of full operations, to prepare to operate effectively and efficiently at the start of full operations on October 1, 2022.

Goals of pre-operations
• Knowledge transfer, staff ramp-up and training
• Training in key procedures for operations on the fully integrated system, e.g. mirror re-coat + transport, camera maintenance that doesn’t require opening dewar
• Ramp up full Data Products Production Operations, including scaling up community use of the Prototype Data Access Center, including full user authentication services
• Begin Science Operations, including setting up procedures for community support, ingesting and reacting to community feedback, a helpdesk, early assessment of the Scheduler’s efficacy for science goals
## Proposed Pre-Operations Activities

<table>
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<tr>
<th>Year</th>
<th>Activities</th>
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<tr>
<td>FY19</td>
<td>Hire several key personnel to lead pre-operations activities, e.g., Director, AURA Deputy Director/Head of Science Operations, Program Manager.</td>
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<td>FY20</td>
<td>DPP Department prepares for ComCam data release to community. Leads of key Science Operations teams put into place, and develop procedures to support community use of commissioning data and to ingest community feedback on commissioning data. An early instantiation of the Data Release Board develops policies and procedures for release of commissioning data to community.</td>
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<tr>
<td>FY21</td>
<td>Begin operation of DAC at NCSA; Transition some software developers to operations to support science operations activities. ComCam data release to community, including community support and response to community-identified bugs and issues with data access and documentation.</td>
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<tr>
<td>FY22</td>
<td>Training in the operation and maintenance of Observatory Operations facilities. Collaboration between heads of each department to prepare Operations procedures and clarify interfaces between departments. Full camera commissioning data release to the community. Operate DPP and Science Operations at ~75% of full FY23 levels, with focus on generating, delivering and assessing commissioning data products for the community.</td>
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Operations Staffing Ramp-Up
Principles for Staffing Transitions

The development of a detailed plan is ongoing.

- Retain core LSST staff through the operations readiness review, so construction and commissioning can be successful
- Retain core LSST staff and expertise into operations, to operate efficiently
- Position team during commissioning for a smooth transition to ops teams
- Ensure that LSST Project staff who are focused on commissioning are not disadvantaged for positions on the ops team, and/or in the new integrated O/IR center (LSST, Gemini, NOAO)
- Benefit from expertise at other facilities that is relevant to LSST operations, and transition new staff onto the team as appropriate. All operations partners [LSST, NOAO, SLAC, NCSA] have staff with specialized expertise relevant to LSST operations.
- Co-locate staff as much as possible
- Name a small number of key roles before Operations Proposal is submitted; These will be responsible for working on the detailed transition plan.
Implementation of Ops Procedures in Commissioning

Jira-based Work Management tool utilized in commissioning will be used in operations.

Early implementation of Observatory Operations procedures, e.g. safety procedures, plan of the day.

Early implementation of DPP and Science Operations procedures, e.g. Science Software evolution.

Early implementation of inter-departmental procedures, e.g. production of alerts during Mini-Survey 2.
Prioritizing Activities During Transition Period

Commissioning activities that will affect long-term operations, and preparedness for the Operations Readiness Review, will get priority over pre-operations activities.

Possible areas of tension, and possible risks in priority conflicts, will be highlighted in the Operations Plan, along with aspects of the pre-Operations Plan that make it resilient to (potential) fluctuating demands on shared resources.
Next steps in Transition Planning

Review the operations staffing plan against commissioning staffing plans to ID which are needed during commissioning, which are likely new hires, and which are likely on staff at an ops partner (even if the position is to be competed).

Make an integrated staffing and transition plan for FY19-FY22, including time for training new staff. Check for staffing gaps and redundancies, e.g. observing assistant staffing level.

Make sure early implementation of key procedures is reflected in the commissioning or pre-operations plans. Check for gaps and redundancies, e.g. knowledge transfer for key camera maintenance procedures.