



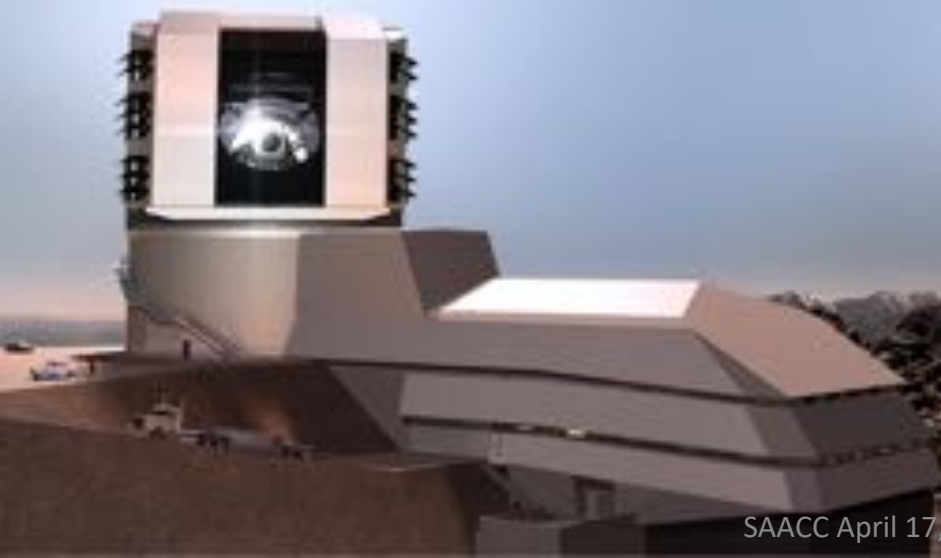
U.S. DEPARTMENT OF
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LSST Operations

SAACC April 17, 2019

Robert Blum



SAACC April 17, 2019 Cerro Calán

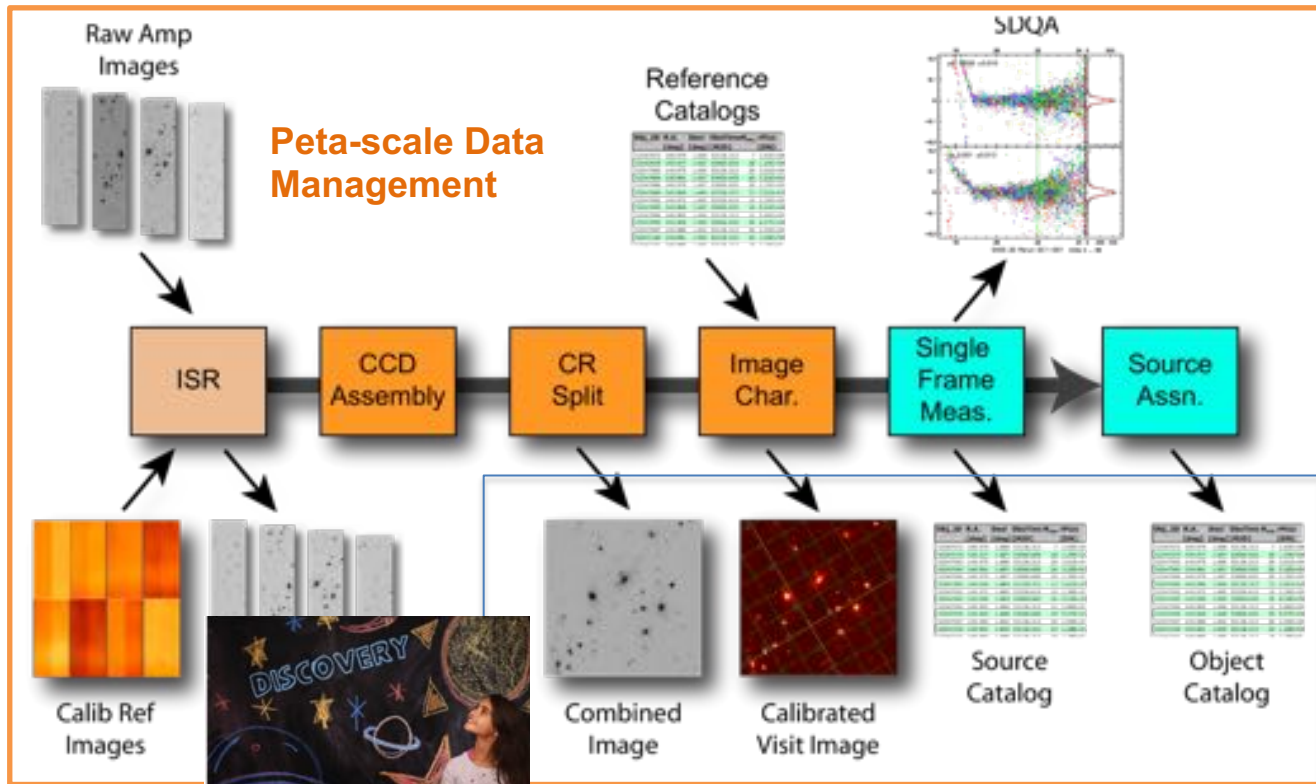


LSST is an Observatory System



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Science and Public user Interfaces





Primary Science Drivers



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Cosmology

Dark energy

Dark matter

Milky Way

Stellar populations

Stellar Streams, Dwarf Galaxies

Solar System

Near-Earth Objects

Trans-Neptunian Objects

Comets

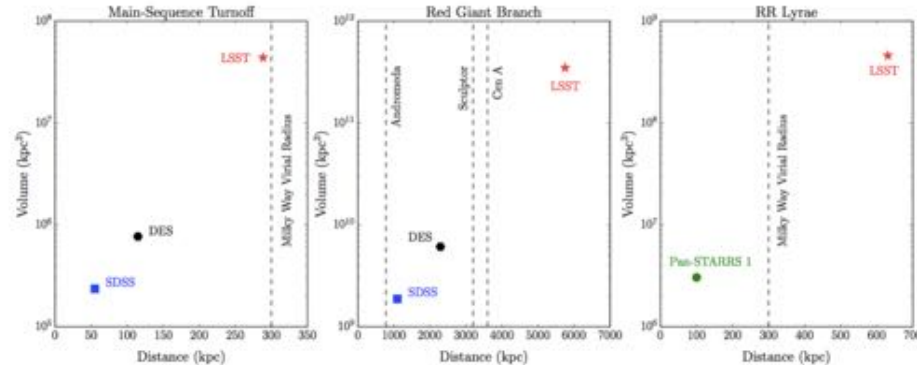
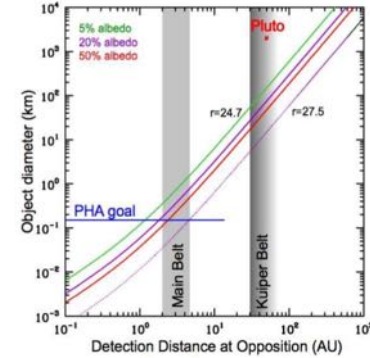
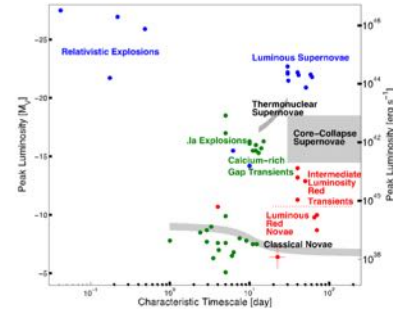
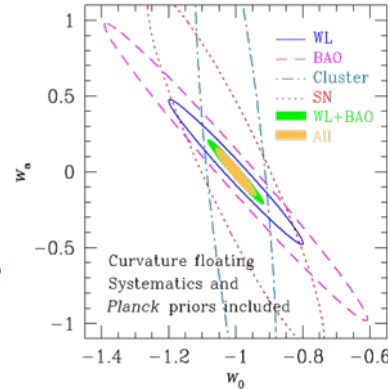
Dynamic Universe

Explosive transients

Multi-messenger counterparts

Variable stars, quasars

Lensing events





Primary Science Drivers



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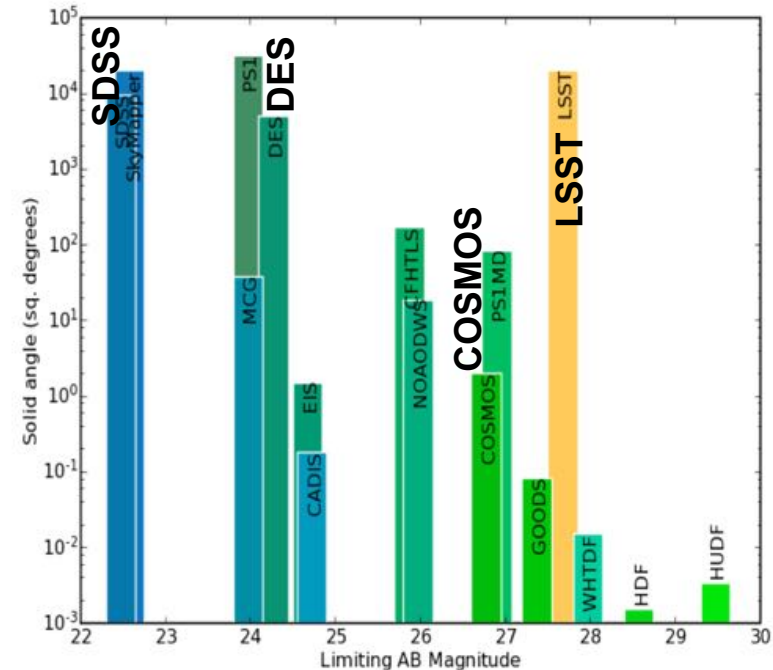
Dynamic Universe

Explosive transients

Multi-messenger counterparts

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Lensing events



100x deeper than SDSS, >10x deeper than DES

Comparable depth to *Hubble* COSMOS,
but over an area 10^4 larger (in 6 filters)



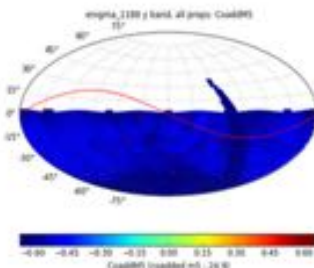
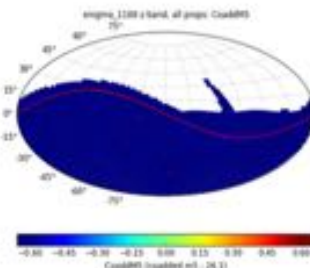
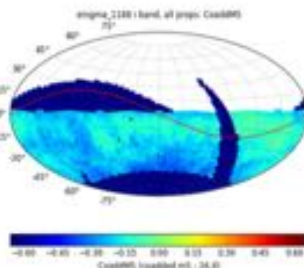
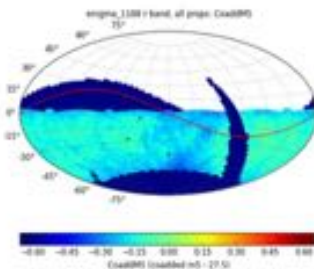
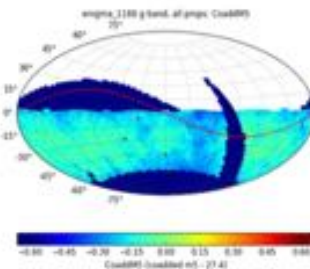
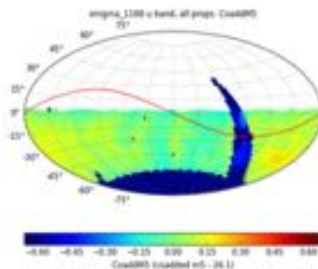


LSST's survey will be a 10-year log of half the sky



LSST will image the entire Southern sky (18k sq deg) every few nights, taking an image every ~40 seconds, for 10 years.

The result: *an 825-frame movie in 6-filter technicolor of every object present*





Data Products



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- A stream of ~10 million time-domain events per night, detected and transmitted to event distribution networks within 60 seconds of observation.
- A catalog of orbits for ~6 million bodies in the Solar System.
- A catalog of ~37 billion objects (20B galaxies, 17B stars), ~7 trillion observations (“sources”), and ~30 trillion measurements (“forced sources”), produced annually, accessible through online databases.
- Deep co-added images.

Prompt

Data
Releases

The production of data products will be transparent: All software is developed open-source and will be available to the community.





Data Products



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LSST will catalog more stars and galaxies than all previous astronomical surveys combined

...but perhaps even more important is the anticipated *quality* and *richness* of the data, as well as *homogeneous* processing.

These data will be made available to all US and Chilean scientists, and named International Contributors with no proprietary period.

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LSST Project Schedule



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

Data Management

Telescope & Site

Facility Support

Final DRP Release

Critical Path is
Dome/TMA/AIV

Pre Commissioning Preparations

Com Cam on Summit

Engineering First Light

Early Integration & Testing

Camera

MIE to Ops

CD-4

Camera has 18
days of float -
Cryostat

NSF MREFC

DOE MIE

Commissioning

Operations

Critical Path

System First Light

Operational Readiness Review

Full Integration & Verification

+6.0

Schedule Contingency

Pre- Full Operations

Construction
Start

Now

Full System
Integration "Start"

Science
Operations Start



15 January
2019



LSST Science Platform Vision

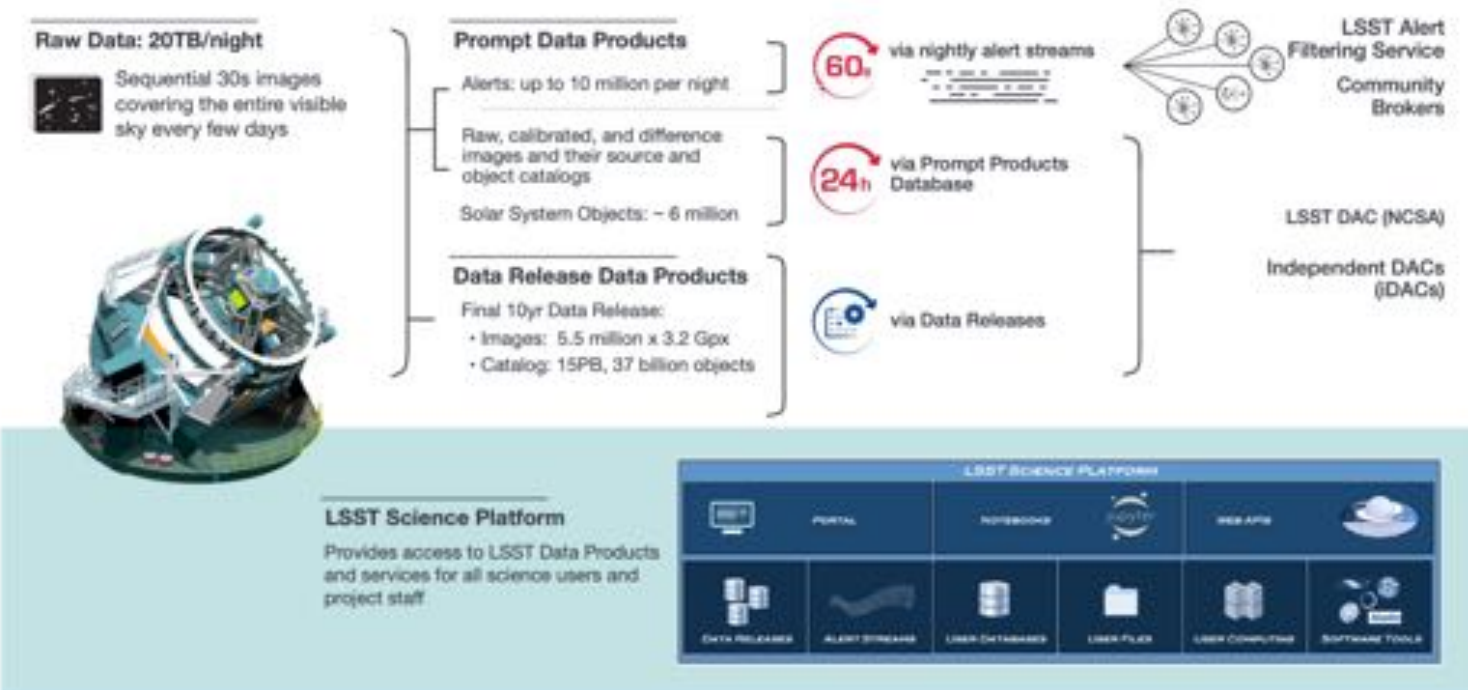
High-level vision for a collaborative environment for LSST Science

- Enable analysis of peta-scale LSST data
- Exploratory analysis through browsing and visualisation
- Enable science discovery by 'bringing the analysis to the data'
- Supports User-Generated product creation
- Integration with extant archives via IVOA protocols
- Collaborative working environment
- Provision of backend computation and analysis resources





LSST Data Management System





LSST Data Management



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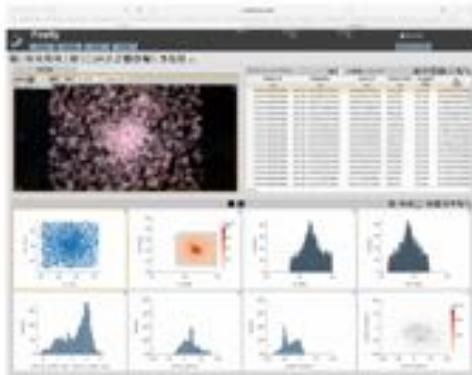
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The LSST Science Platform - Current Snapshot



Portal Aspect

exploratory analysis and
visualization of the LSST archive



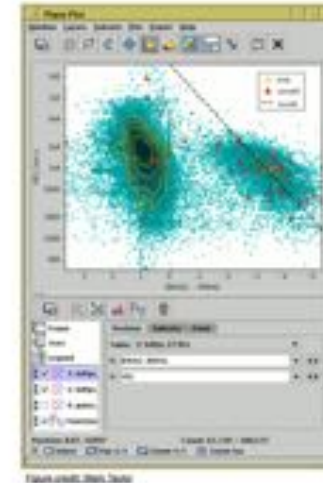
JupyterLab Notebook Aspect

in-depth 'next-to-the-data' analysis &
creation of added-value data products



Web API Aspect

remote access to the LSST archive
via industry-standard APIs





Summit Facility Progress



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Primary Sites of LSST Operations



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French satellite center
(CC-IN2P3, Lyon, France)

Data Release Production (50%)



SLAC Center

Data Products Production Support
Science Operations and Community Support



Archive Site Archive Center

Alert Production

Data Release Production (50%)

Long-term Storage (copy 2)

Data Access Center

Data Access and User Services

HQ Site

Science Operations headquarters
Operations office
Education and Public Outreach

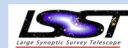


Summit and Base Sites

Telescope and Camera Operations
Data Acquisition

Long-term storage (copy 1)

Chilean Data Access Center



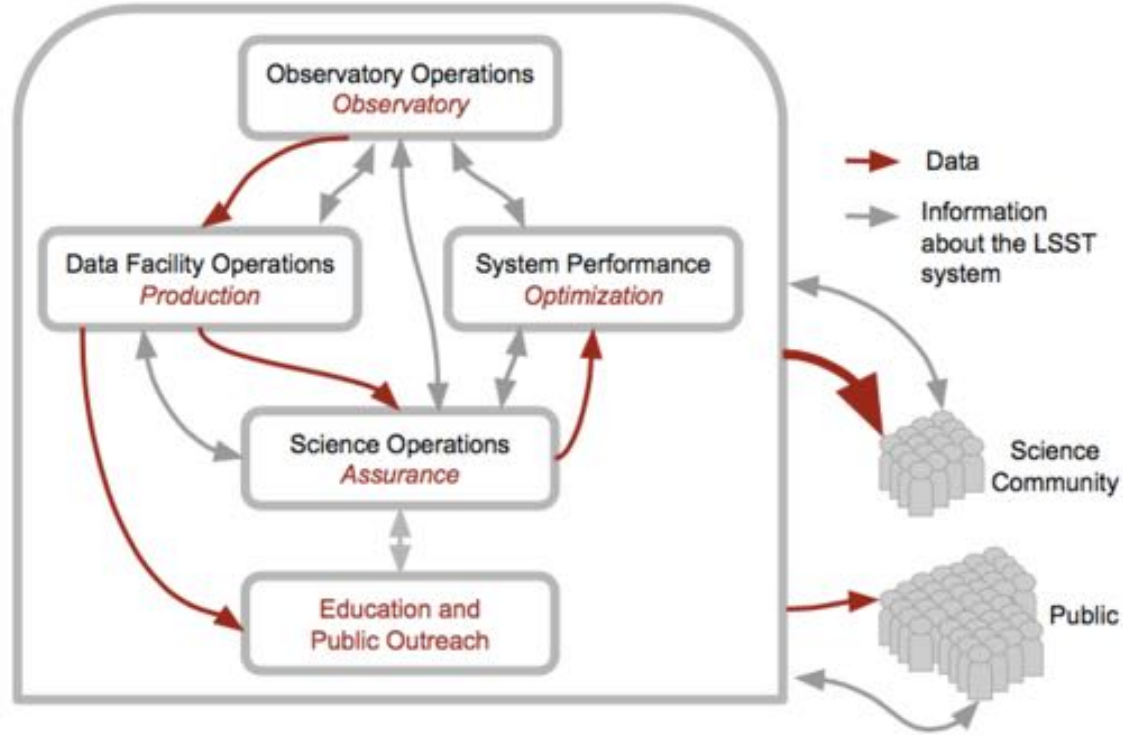


Five Operational Departments



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Staffing for Operations



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