

LSST

Large Synoptic Survey Telescope

The LSST System

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The Large Synoptic Survey Telescope is a single system to provide an end-to-end astronomical survey facility to acquire, process, analyze, catalog, and maintain the world's largest database of optical astronomical data. The LSST Observatory will be sited atop Cerro Pachón in Northern Chile, near the Gemini South and SOAR telescopes. The sky coverage will be full hemisphere with 2000 exposures in six bands from 320-1050nm per 10 square degree field. LSST will also open the time domain for studies of transient and moving objects. The integrated system includes the telescope to the data centers that support the key science deliverables and individual users. The ability to support many science missions from a single database has lead to broad support from the community.

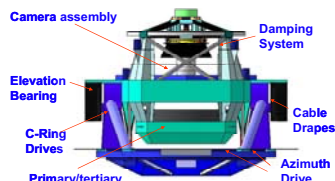
Observatory Sites



The LSST Observatory is distributed among sites from the Cerro Pachón mountain top where data are taken in Northern Chile, to the base facility in La Serena, to NCSA - host of the LSST archive center at the University of Illinois, and to other data centers for redundancy and data serving

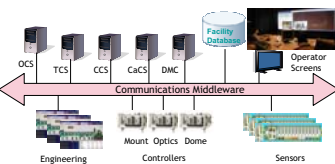
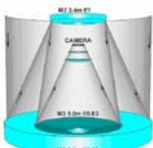


Telescope

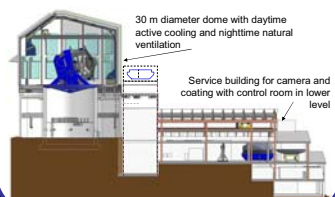


300 ton altitude over elevation mount carries the compact optical system, re-pointing every 30 seconds

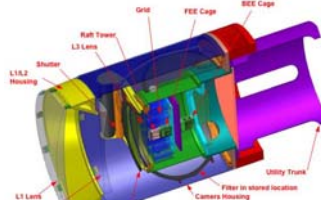
Optical system provides 6.7 m effective aperture over 3.5° FOV. Excellent image quality achieved with limited degrees of freedom (M2 & camera positions)



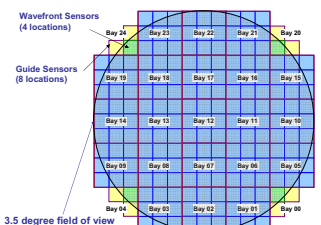
Efficient and safe observing is result of a distributed supervisory control and data acquisition system with robust middleware used throughout the observatory, telescope and camera control systems



Camera



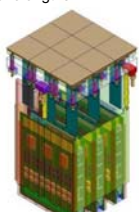
Camera includes three refractive lenses, 5 filter set, -100 K dewar with focal plane, and shutter



64cm diameter focal plane covers 3.5° FOV with 201 4K x 4K deep depleted devices to cover 350 to 1050 nm wavelengths

Raft Tower Module

9 Si CCD sensors are packaged with associated front and backend electronics to form a standard building block for the focal plane



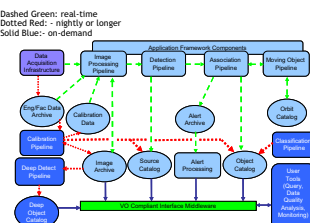
Data Management



LSST will use existing NSF-funded networks (TeraGrid, NLR, ESNET and their successors) for data transfer and distribution in the U.S.

LSST will use 2.5 Gbps avg/10 Gbps peak protected fiber optic networks (REUNA, LAUREN, and WHREN-LILA) to connect the Mountain Base to the U.S.

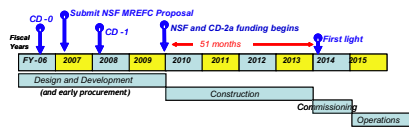
LSST data transfer capitalizes on existing dark fibers with > 2 Tb/s capacity today



LSST data management pipelines serve the broad US community with raw images, transient alerts within 30s, and catalogs of processed data.

Processing Cadence	Image Category	Catalog Category	Alert Category
Nightly	Raw science image Calibrated science image Subtracted science image Noise image Sky image	Source catalog (from difference images) Object catalog (from difference images) Orbit catalog	Transient alert Moving object alert
Data Release	Stacked science image Template image Calibration image RGB JPEG images	Source catalog (from calibrated science images) Object catalog (optionally measured properties)	Alert statistics and summaries

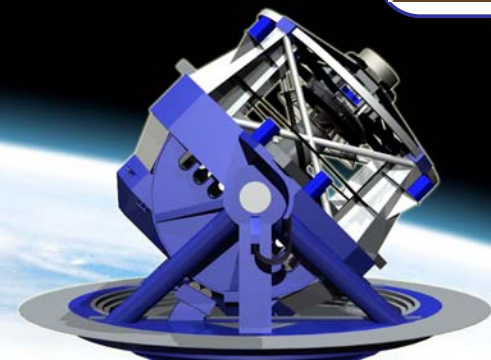
Project Management



The strategy and timelines for bringing the system together include construction beginning in 2009 October and first-light in 2013 December.

Open Source -- Open Data

<http://www.lsst.org>



The effort to build the Large Synoptic Survey Telescope is overseen by the LSST Corporation, a non-profit 501(c)3 corporation formed in 2003, with headquarters in Tucson, AZ. The LSST research and development effort is funded in part by the National Science Foundation under Scientific Program Order No. 9 (AST-0551161) through Cooperative Agreement AST-0132798. Additional funding comes from private donations, in-kind support at Department of Energy laboratories and other LSSTC Institutional Members.