

LSST Large Synoptic Survey Telescope

The LSST System

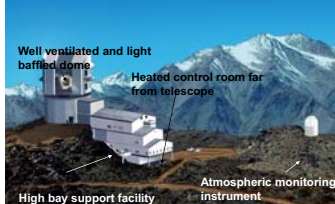
S. Wolff, D. Sweeney (LSSTC/LLNL), J.A. Tyson (UCD), T. Axelrod (LSSTC), C.F. Claver (NOAO), D.K. Gilmore (SLAC), Z. Ivezic (UW), S.M. Kahn (SLAC), J. Kantor (LSSTC), V.L. Krabbendam (NOAO) and the LSST Collaboration

- An 8.4m (6.5m effective), wide-field (9.6 degree²), ground-based telescope with a 3.2 GPixel camera
- Survey over 20,000 degree² with 1,000 re-visits over 10 years in six visible bands
- Acquire, process, and catalog the world's largest database of optical astronomical data
- Scheduled to begin full scientific operations in 2016

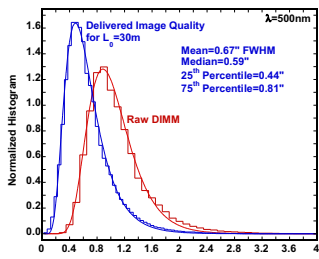
Observatory Site



Site location near La Serena, Chile



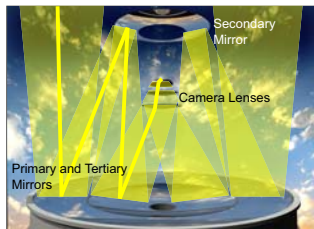
Site layout



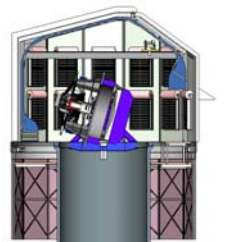
Site Seeing: Delivered ~ 0.7 arcsec median

Telescope

- High throughput optical system
 - 8.4 meter primary aperture
 - 3.5 degree field of view
 - f/1.2 beam
- Tight control of systematic error
 - PSF shape control
 - Delivered Image Quality ~ 0.3" FWHM
- Quick and agile telescope system
 - 32 second visit per pointing
 - 5 Sec slew & settle* between visits
 - Robust Scheduling and Control
- High efficiency and duty cycle
 - Repeating all night, each night for 10 years
 - Unscheduled downtime < 3%
 - Maintenance support to limit downtime

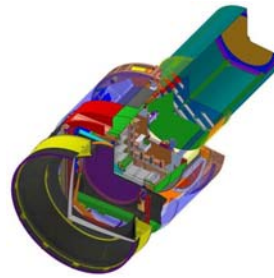


Optical Configuration



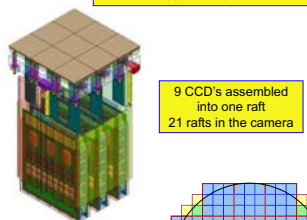
Carousel dome

Camera



Five filters are resident in the camera; the active filter can be changed in less than 90 seconds

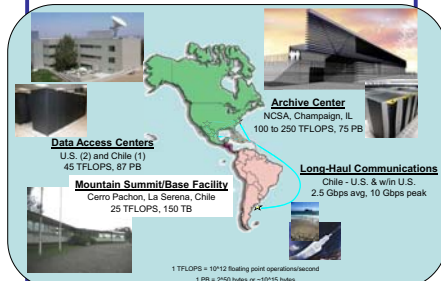
4K x 4K pixels on 10 μ m centers
16 readouts/sensor
330 nm to 1070 nm response
1 second read time



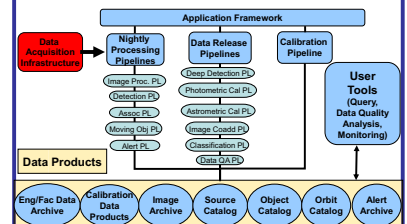
The 63cm diameter focal plane has 189 CCD's arranged on 21 modular rafts

Data Management

The LSST Observatory will produce 15 Terabytes of data per night

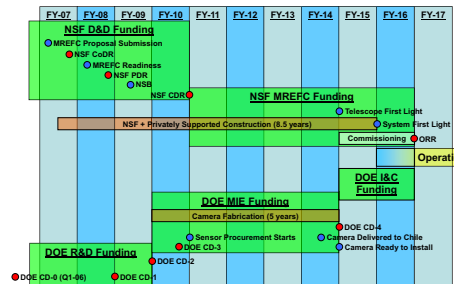


Infrastructure Layout



Middleware and Applications Software

Proposed Project Schedule



LSST is a public-private partnership. Design and development activity is supported by in part the National Science Foundation under Scientific Program Order No. 9 (AST-0551161) and Scientific Program Order No. 1 (AST-0244680) through Cooperative Agreement AST-0132798. Portions of this work are supported by the Department of Energy under contract DE-AC02-76SF00515 with the Stanford Linear Accelerator Center, contract DE-AC02-98CH10886 with Brookhaven National Laboratory, and contract W-7405-ENG-48 with Lawrence Livermore National Laboratory. Additional funding comes from private donations, grants to universities, and in-kind support at Department of Energy laboratories and other LSSTC Institutional Members.

Brookhaven National Laboratory, California Institute of Technology, Columbia University, Google, Inc., Harvard-Smithsonian Center for Astrophysics, Johns Hopkins University, Kavli Institute for Particle Astrophysics and Cosmology - Stanford University, Las Cumbres Observatory Inc., Lawrence Livermore National Laboratory, National Optical Astronomy Observatories, Princeton University, Purdue University, Research Corporation, Stanford Linear Accelerator Center, The Pennsylvania State University, The University of Arizona, University of California at Davis, University of California at Irvine, University of California at Los Angeles, University of Chicago, University of Illinois at Urbana-Champaign, University of Pennsylvania, University of Pittsburgh, University of Washington