Large Synoptic Survey Telescope

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LSST Telescope and Site Overview Update

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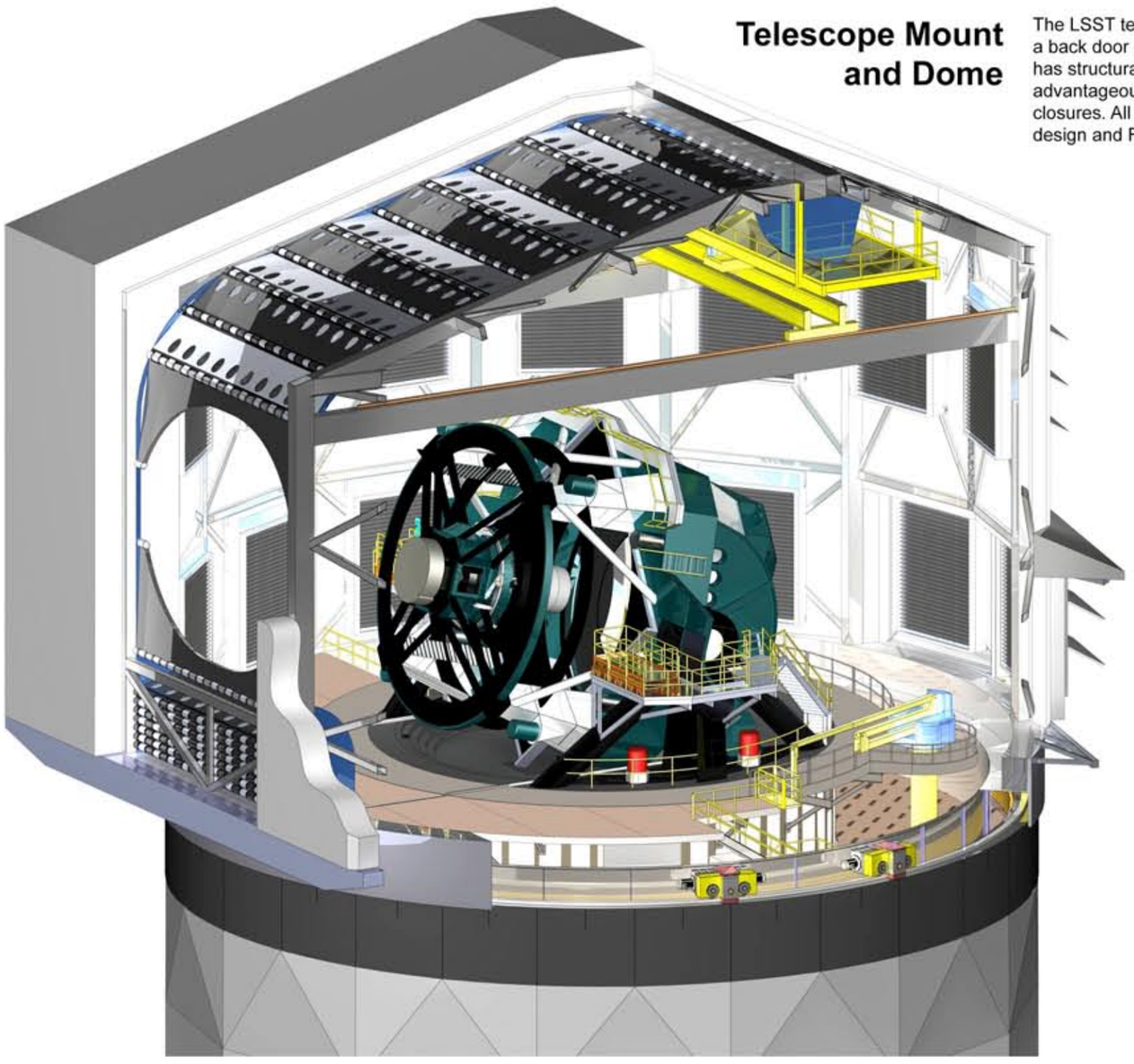
Design of the Telescope and Site system for LSST is advancing to preliminary design and fabrication of all the mirrors for the system has begun. The telescope system is designed to contribute 0.25 arc sec FWHM to the overall system image quality error budget (0.35 arc sec). Keys to meeting this budget are the three mirrors and an active optics control system. The active optics control system has been prototyped with curvature wavefront sensing measurements at four focal plan locations and reconstruction algorithms to drive the degrees of freedom in the mirror systems and maintain alignment of the camera. The primary-tertiary monolithic mirror is being fabricated at the Steward Observatory Mirror Lab using their structured borosilicate spin casting technology. The secondary mirror substrate is being fabricated at Corning Incorporated using their ULE™ thin meniscus mirror technology. The telescope mount and optical support structure is compact, stiff, and agile to maximize observing efficiency achieving a simulated 10 year survey with over 2 ½ million fields visited. Hydrostatic bearings to support the 300 ton telescope structure while maintaining a first mode frequency of more than 8Hz have been identified. Adjustments to the dome and facility design have been made for improved performance, operations, and maintenance and site civil engineering has been completed to determine excavation plans for the site.



Telescope Mount and Dome

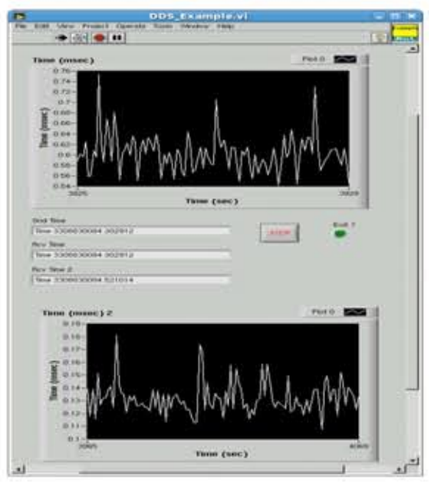
The LSST telescope and dome designs have advanced to address configuration and technical details. The dome has been configured with a back door opposite the main slit for mirror removal, replacing the original concept of moving the mirror through the front of the slit. This has structural advantages in allowing the arch girders to be supported up to the level of the minimal observing elevation. It is also advantageous for minimal exposure during the mirror removal. The side vents have changed from roll-up style doors to large louver style closures. All dome vents still have stray light baffles to insure multiple reflections for any ambient light to pass through. The telescope mount design and FEA model have been updated to include hydrostatic bearings consistent with results from a design study conducted with SKF.

LSST Mirrors Advance

The M1M3 monolithic primary mirror was successfully cast and revealed to many LSST and SOML staff in late August 2008. The near perfect casting exceeded expectation and has since been moved to a vertical position for refractory clean-out. The yellow tint to the glass in the central region is due to the extra 2.1 cubic meters of glass that will be ground out to be the 5 meter diameter tertiary surface. See poster 460.22 for more on the status of the M1M3 and M2 mirrors.

Software development focuses on prototypes and testing

An end to end test of communications from TCS control streams and OCS monitoring activities was completed. The reference design DDS middleware package from RTI was used with a performance of ~600 µsec message latency. Tools are in place to develop representative Mysql facility database packages to support both system and subsystem level code development. The LSST will generate and store ~30Gbytes of command and status metadata per day.

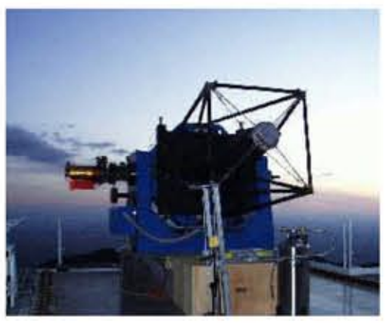


Site Environmental Permitting Complete!

In July of 2008, AURA submitted on behalf of LSST the **Environmental Impact Declaration** (*Declaración de Impacto Ambiental [DIA]*) to CONAMA (*Comisión Nacional de Medio Ambiente*), the Chilean Environmental Protection Agency. The DIA is a description of the construction and operation phases of the project and describes any direct foreseeable environmental impacts. The report was reviewed by CONAMA and its regional counterpart, COREMA and seventeen Chilean Government agencies. Representatives participated in a site visit in August 2008 and submitted two rounds of clarification questions and comments. The DIA The DIA was unanimously accepted at the December 2, 2008 COREMA meeting providing the permits necessary to build and operate LSST on Cerro Pachón.

LSST Acquires 1.2m Calypso Telescope

Primary Diameter	1.2 meters
Optical Design	Ritchey-Chretien
Effective Focal Length at Naysmith Foci	21.6 meters
Coma-Free Field	30 '
Diffraction Limit	0.12 "
Total Wavefront Error	1/17th (Visible)
Contrast Performance	12 mags at 2 "
Mounting	Computer-Driven Alt Az
AO Method	Tertiary Tip-Tilt

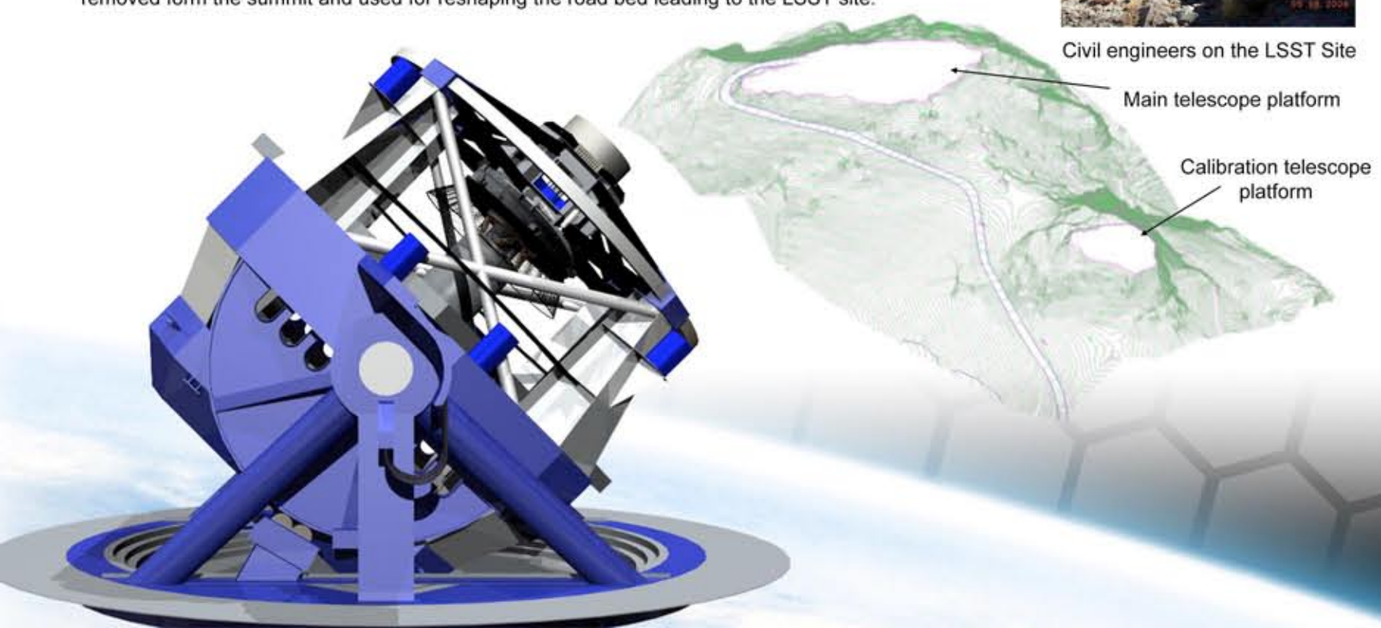


The LSST Project has acquired the Calypso 1.2m Telescope currently in operation on Kitt Peak. LSST plans to use the telescope in place to conduct unique scientific investigations in support of calibration plans and to prototype hardware and software components. LSST further plans to move the telescope to Chile and install it for use as the LSST calibration telescope. Calypso's development was led and funded by Edgar O. Smith in the late 1990s. His team developed the state-of-the-art telescope to perform leading edge science and support Smith's personal interest in high-resolution imaging of globular clusters. The telescope was finished in 2001 and has been in operation as a stand alone private facility on Kitt Peak since then. The table above describes the telescope and its high quality optical design.

Civil engineering completed for initial site leveling

ARCADIS Geotechnica in Santiago Chile, a global architectural and engineering firm, completed the civil engineering work for the LSST site. Their contracted effort included the review of site geotechnical reports, inspection of the site, and development of the excavation plan for the initial leveling of the site. They delivered a full specification and procurement package for soliciting the early excavation and road development on site. The plan developed includes a series of non critical excavation sections for fine tuning the boring and small charge blasting process before reaching the critical sections near the eventual telescope pier. Roughly 17,000 cubic meters of material will be removed form the summit and used for reshaping the road bed leading to the LSST site.

Civil engineers on the LSST Site



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