

ENGINEERING THE GIANT MAGELLAN TELESCOPE



Stray Light Analysis

A challenge faced by all telescopes is how to get the “right” light to the detector, while eliminating all sources of “wrong” light. Modern software tools for stray light analysis enable engineers to analyze all potential sources of unwanted photons and include appropriate mitigation strategies in the opto-mechanical design.

Mirror Coating

Telescope mirrors must be regularly re-coated, and research is constantly improving the standard and reliability of coatings. Current work suggests the possibility of using “hydrophobic” coatings, as used in the ophthalmic lens industry, to prevent the adhesion of dust to the mirror surface, thus enhancing the useful lifetime of a given coating.

Telescope Alignment and Active Optics

Aligning the optical elements of a telescope is a major challenge for engineers. Since the 1980’s, Active Optics, a closed loop correction for deformations and misalignments, has become the standard way astronomical telescopes ensure delivery of the best possible images through the atmosphere.

Giant Problem Solvers

A telescope engineer has to solve a range of problems during design and construction.

Electrical Engineers: Working with Mechanical and Systems Engineers, Electrical Engineers are responsible for planning and implementing the distribution of power, ground, and signal cabling to the main telescope system, including the selection and placement of electronic cabinets and distribution boxes

Opto-Mechanical Engineers: Responsible for the mechanical and thermal support systems for the telescope optics, optical handling equipment, and diagnostic optical test instruments, Opto-mechanical Engineers play a key role in the development and manufacturing of telescope optical support systems.

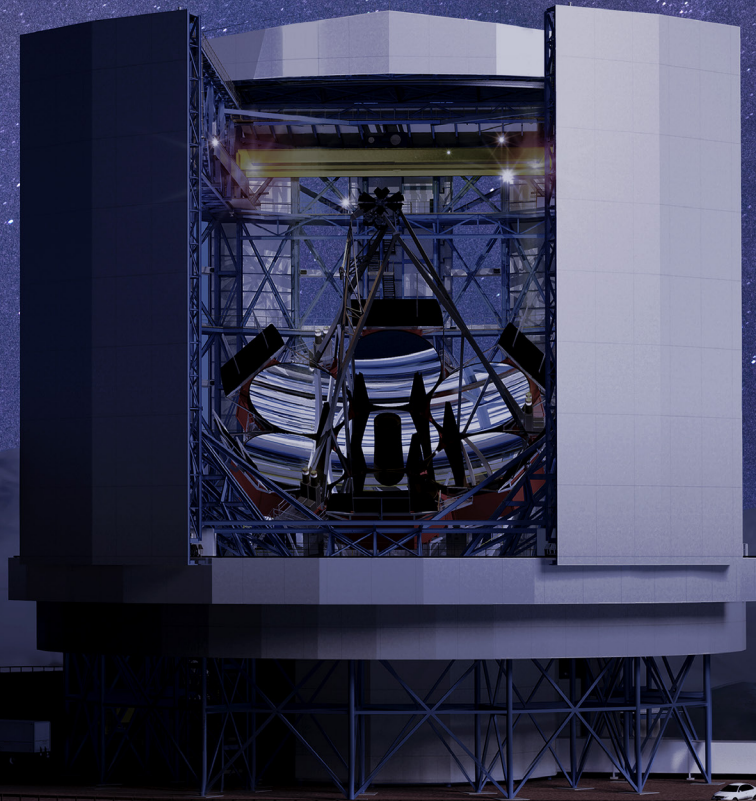
Software Engineers: Software Engineers work on the overall design of the telescope’s control system, including the hardware and software for controlling the opto-mechanical subsystems, the distributed software and services that coordinate those

subsystems, the observatory software, and the software to process and manage scientific data.

Systems Engineers: Systems Engineers bring a particular perspective to the engineering process through requirements definition, interface negotiation, top-level functional designs, performance predication, and verification. Where other engineering disciplines concentrate on the specifics of the observatory systems, Systems Engineers focus on the integration of all of these aspects into a coherent and effective observatory.

Project Controls: An integral part of the Project Management team, Project Controls is responsible for planning, scheduling, and measuring progress of the telescope. The team monitors and reports against the implementation plan from conception to final delivery of the system to operations.

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