
TMT Laser Guide Star Facility Preliminary Design

Melissa Trubey^{*1}, Corinne Boyer¹, Angelic Ebberts¹, Ben Irarrazaval¹, John Miles¹,
Fernando Santoro¹, Konstantinos Vogiatzis¹, and Lianqi Wang¹

¹TMT International Observatory – United States

Abstract

The Laser Guide Star Facility (LGSF), part of the adaptive optics (AO) system of the Thirty Meter Telescope (TMT), is responsible for generating the artificial guide stars in the mesospheric sodium layer with the brightness, beam quality, and asterism geometries required by the telescope's first light AO system and future AO instruments. It includes up to 8 sodium lasers mounted on the telescope's elevation structure behind the primary mirror, the conventional beam transfer optical system to transport the beams to the top end behind the secondary mirror, and the formatting and launching optical system to generate and project up to 4 required laser guide star asterisms to the sky using a center launch telescope. In this paper, we will present the LGSF preliminary design, including the optical, mechanical, electronics, software and safety designs.

Keywords: Laser Guide Star Facility, extremely large telescope, Thirty Meter Telescope

^{*}Speaker