Analyzing the AO Operational Behavior of Non-sidereal Tracking on the Thirty Meter Telescope using SysML

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Abstract

TMT has embarked on an ongoing effort towards modeling the functional and physical architecture, behavior, requirements, and parametric relationships through system-level simulation of observation workflows, using OMG's Systems Modeling Language (SysML), to validate use-case scenarios and verify timing requirements early in the life-cycle phase. This paper presents preliminary results for non-sidereal tracking scenarios, especially for fast targets where the on-instrument wavefront sensors must hand off from one guide star to another. Operational modes and behavior are modeled using activity diagrams. Scenarios are captured primarily using sequence and activity diagrams. Verifiable requirements are formally captured using constraints on properties. This type of modeling can be particularly useful when investigating the effect of parallelizing or re-ordering sequence tasks.

Keywords: MBSE, SysML, Requirements, TMT

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