

TMT novel technologies

B. Ellerbroeck and D. Crampton

Thirty Meter Telescope Project Office, 305 S. Hill Street, Pasadena, California, USA

Abstract. The ongoing conceptual design activities for the Thirty Meter Telescope (TMT) illustrate many (if not virtually all) of the advanced instrumentation technologies under consideration for future extremely large telescopes. First light capabilities must be based upon credible extrapolations of existing systems and components, while potential upgrades and follow-on systems should explore the full range of advanced and innovative technologies currently proposed for scientific instrumentation and adaptive optics (AO). An affordable technology development program must then be implemented which balances these conflicting objectives.

In this paper, we outline the range of innovative AO component technologies now under discussion for TMT, and describe some of the contracts and studies comprising our AO development program. Components that require advances include piezostack and MEMS deformable mirrors; adaptive secondary mirrors; fast, low noise detectors for both laser- and natural guide star wavefront sensing; guidestar laser sources; and processing electronics for the implementation of AO control algorithms. Instrumentation studies are also underway that investigate issues related to the huge size of seeing-limited instruments; large gratings; integral field spectroscopy; detectors; and advanced techniques for sky subtraction.

This paper was combined with that of Hubin *et al.* and the full text published earlier in these proceedings.