

McCrady et al.

NGAO Preliminary Design Review

To be presented as part of NGAO session at 10:30 am

NGAO PDR June 14 & 15 Panel Members

- Betsy Barton, UC Irvine
- Corinne Boyer, TMT
- Jay Elias, NOAO
- Brent Ellerbroek, TMT [Chair]
- · Andrea Ghez, UCLA
- Norbert Hubin, ESO
- Matt Johns, GMT

July 7, 2010

SSC Meeting

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Additional non-PDR-panel, non-NGAO-Team attendees:

- * Mike Bolte and Shri Kulkarni (UCO and COO Directors)
- * X. Prochaska (SSC Co-Chair)
- * Mark Morris (NSAT Chair)
- * David Sprayberry and Mark Trueblood (NOAO TSIP)
- * Jerry Nelson
- * Taft Armandroff and Hilton Lewis

NGAO PDR Charge

The review panel will be provided with documentation describing the science cases, requirements, preliminary design for the system, technical risk assessment, and the project plan and budget to completion. Using this material the panel is asked to do the following:

- Assess the impact of the science cases in terms of the competitive scientific landscape in which the system will be deployed.
- Assess the completeness and consistency of the technical requirements, including whether they appropriately flow from the science cases.
- Evaluate the preliminary design for technical feasibility and risk, and assess how well it meets the scientific and technical requirements.
- Assess whether the design can be implemented within the proposed schedule and budget.
- Evaluate the suitability and effectiveness of the project management, organization, decision making and risk mitigation approaches, with an emphasis on the next project phase (detailed design) and also with respect to the entire project.
- Provide feedback on whether the overall strategy will optimize the delivery of new science.
- Gauge the readiness of the project to proceed to the detailed design phase.

NGAO PDR Panel Feedback [1]

"The review committee is pleased to congratulate
the WMKO NGAO team on their successful PDR.
The enthusiasm, expertise, and level of work
performed by the team are very clear from the
presentations and the documentation provided.
NGAO will represent a dramatic improvement in
WMKO scientific capabilities, which will continue
unmatched for many years, and which will remain
competitive into the era of extremely large
telescopes, JWST and ALMA. The development of
NGAO is critical to WMKO's future as a facility
producing forefront science and as a leader in
adaptive optics development."

NGAO PDR Panel Feedback [2]

 "The science enabled by NGAO is very compelling. At its predicted performance level, NGAO represents a striking improvement over the existing Keck AO system, which is already the "gold standard" of a high-impact, highly demanded, and highly replicated science instrument on Keck II. With dramatically improved sky coverage, NGAO will represent a paradigm shift by extending the applicability of LGS AO to routine use for nearly any science program at near IR wavelengths (> 0.8 µm) that requires only a modest field of view (< 30") or single-object spectroscopy. With major gains in Strehl ratio, NGAO's image quality will rival and typically exceed space missions. As such, NGAO represents a major step forward. The predicted performance of NGAO leaves little doubt that its advantages in various areas are demonstrable and significant with respect to existing AO systems, other planned AO systems on 8-10-meter class telescopes, and even JWST."

NGAO PDR Panel Feedback [3]

 "The currently envisioned NGAO system successfully optimizes the delivery of new science. Many key questions from a broad array of sub-disciplines (ranging from the solar system all the way to extra-galactic) can be addressed with a next generation AO system that both increase the sky coverage for AO observations and has significantly smaller wavefront error. The latter will enable much higher Strehl ratios at the wavelengths currently used to perform AO observations, as well as workable Strehl ratios for the first time at shorter wavelengths. While most planned AO systems have currently optimized one or the other quantity (e.g., wide-field low, order systems that have improved sensitivity but low Strehl, or narrow field, high-contrast systems), Keck's NGAO system architecture provides a unique and powerful combination of sky coverage and performance, which will likely give it the widest scientific reach of any AO system in the upcoming decade."

NGAO PDR Panel Feedback [4]

- "The budget presented looks realistic but remains tight considering the potential risk of schedule slippage"
- "We note that the overall contingency of NGAO seems consistent with the overall TMT AO contingency at the level of 1%."
- Challenges identified:
 - Need full-time Project Manager, Systems Engineer, AO
 Operations Scientist; ramp-up in overall staffing [WMKO had planned to address in next project phase]
 - Schedule is aggressive; potentially underestimated duration of integration phase
 - Real-time control system may not be at PDR level
 - Not funded for detailed design and fabrication phases

NGAO Key Issues

- Lack of private lead gift for NGAO
 - Continue to seek through end of 2010
- Well-funded, ambitious AO at VLT, LBT, Gemini
- How to leverage federal support to keep WMKO
 AO competitive
- What will Astro2010 report include re: NGAO, WMKO, and NSF mid-scale funding programs?
 - How to leverage Astro2010 for AO competitiveness
- These issues will be discussed extensively at this meeting and at Friday's CARA Board meeting.
 - Important ideas in Observatory Report, Federal Proposals section, and in NGAO Team Report