Keck Next Generation Adaptive Optics
Real-Time Controller Design Review
Charge and Review Process

Don Gavel

November 20, 2009

There will be an internal review of the NGAO adaptive optics real-time control system held on December 10, 2009. The purpose of the review is to evaluate the proposed system design and confirm that it will meet the requirements of NGAO as well as be a good starting point for continuation into final design phase.

The review panel consists of experts real-time control, one from Keck Observatory, one from Jet Propulsion Laboratory, and one from the Thirty Meter Telescope Project. The review panel is being provided a detailed design document describing the proposed design, and a spreadsheet of the requirements taken from the Contour database with annotations of the design's compliance. Design documentation material is available on the web page
http://www.oir.caltech.edu/twiki_oir/bin/view/Keck/NGAO/RTCminiDesignReviewDec09.

Using this material, the panel is asked to evaluate the proposed design for the following:

- **Technical feasibility and design completeness**: The design should be at PDR readiness level. Algorithms are fully specified; computer system is fully specified; selection of vendor-supplied components is ready to begin or has already started.
- **Satisfies requirements**: A spreadsheet has been provided which list requirements and comments on how the design is intended to meet them. Note that several of the requirements were not originally specified at the start of the design process. These have been subsequently set by the design team to what we believe to be reasonable values consistent with NGAO goals and error budgets. These requirements may need further review.
- **Risk**: The reviewers should judge if the design has considered a low-risk approach. However, this is not intended to be a risk assessment review.
- **Cost effectiveness**: The reviewers should judge if the design has proceeded with an eye towards cost-effectiveness. However, this is not intended to be a cost review.

The following item is not completed:

- Detailed layout of four types of specialized FPGA boards for the tomography engine. The needed functions of these boards have been specified and the board architectures have been defined. These boards will be contracted out for detailed layout subsequent to this review.

The following areas are not considered to be in the scope of this review:

- Supervisory Control functions (the RTC interfaces to the supervisory controller)
- Enclosure or environment control (we will cover heat dissipation, size, and weight of the RTC)
- Operator's Interface (we will provide an engineering interface and a testing plan)

The review committee consists of the following people:

- Corinne Boyer (chair), TMT project
- Tuan Truong, JPL
- Erik Johansson, Keck Observatory

Thank you to the reviewers for agreeing to participate. You bring very valuable insight and experience to the review process

The RTC design team consists of the following people:

- Donald Gavel, UC Lick Observatory
- Marc Reinig, UC Lick Observatory

The schedule for the review is as follows:

- Design group posts material to web site: **end of day Dec 1**
- Response from reviewers due: **end of day Dec 6** (start of day Dec 7, which is a Monday)
- Design group's response to reviewer questions: **end of day Dec 8**
- Review meeting: **10:00am-1:00pm Dec 10** (hopefully just 2 hours instead of 3)

Reviewers should submit written questions to Don Gavel, gavel@ucolick.org. Questions received by the deadline will be addressed with response during the review presentations.

The summary review meeting will take place on Thursday, December 10, starting at 10 am PDT. We will use video conference facilities at the CfAO to connect with other sites. Please contact me if additional site connections are needed.

Thank you for helping out and participating in this review!

Don Gavel
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