



**Keck Next Generation Adaptive Optics  
Control Electronics Architecture Mini-Review  
Charge and Review Process**

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January 15, 2010

The Next Generation Adaptive Optics (NGAO) Project will provide a Preliminary Design Review (PDR) of the project in the second quarter of calendar year 2010. As part of the PDR, the team will present the control electronics architecture for the Keck NGAO System. By control electronics, we mean electronics, used throughout the various NGAO subsystems, to provide some form of configuration, control and / or status. This includes power control, environmental control, camera configuration, general sub-system control (e.g., the laser units, the RTC) and the controls infrastructure. This does not include devices creating motion or the real-time aspect of devices used for wavefront sensing and correction. Motion devices will be covered under a separate Motion Control subsystem and the wavefront sensing and correction devices are covered under the RTC subsystem.

When we refer to architecture, we are referring to the electronics concepts and approaches we plan to use to support the design of the NGAO control system. The NGAO system is made up of numerous devices, many of which are part of the control system and must be controlled in some fashion.

This mini-review is being held in preparation for the PDR. The purpose of the review is to evaluate the proposed control electronics architecture to confirm that they will meet the NGAO requirements. This review is not intended to review requirements that have been previously agreed upon by NGAO System Engineering. However, the team may propose changes to the requirements to ensure the success of the NGAO system. A successful review will ensure the planned architecture can move forward towards PDR.

We have assembled a review panel consisting of two experts from WMKO and one from our partnered organization, CalTech. The review panel will be provided documents describing the proposed control electronics architecture. Other supplemental material including this document and the requirements will also be available in support of the review. Using this material and those presented at the review, the panel is asked to evaluate the proposed designs and answer the following questions:

- Are the requirements understood?
- Does the proposed electronics satisfy the requirements?
- Is the architecture
  - Complete?
  - Technically feasible?
  - Cost effective?
- Is the architecture sufficiently matured enough that it can be developed to the PDR level by the 2<sup>nd</sup> Qtr of 2010?

The following items will not be covered in this review; but will be included in the overall PDR:

- Overall architecture of the NGAO control system or the top-level design of the NGAO control system
- Motion control devices
- Real-time control devices for wavefront sensing and correction
- Software controls
- Effort Estimates
- Budget
- Schedule

The review will take place on Tuesday, January 26 2010, at 8:00AM HST. The PolyCom Video System will be used to connect with participants from CalTech and UCSC. The review committee consists of the following people:

- Thomas Stalcup (WMKO), Chair
- Tomas Krasuski (WMKO)
- Richard Dekany (CalTech)

The Control Electronics team consists of the following personnel from WMKO:

- Ed Wetherell, Kevin Tsubota

The agenda for the review is as follows (all times are HST):

- 8:15 AM: Welcome and introductions
- 8:30 AM: Presentations
- 9:30 AM: Break
- 10:00 AM: Review committee comments discussion and questions
- 11:00 AM: Review committee closed session
- 11:45 AM: Review committee feedback to team

Based on the review material, reviewers may submit written questions to the Control Electronics team on areas or issues they would like to see covered during the review. Questions should be directed to Kevin Tsubota ([ktsubota@keck.hawaii.edu](mailto:ktsubota@keck.hawaii.edu)). Questions received by COB on Jan 22, 2010, will be addressed with a written response during, or prior to, the review presentations. We will make every attempt to provide formal written responses to questions received after the 22nd; however, we may only be able to provide verbal responses during the review, depending on the circumstances.

At the conclusion of the review, the committee is asked to provide the NGAO Project Manager and the Electronics Control team with verbal feedback as to their recommendations and concerns. A final report of findings, recommendations and comments is requested within one week of the review from the committee chair. The written report should be addressed to the NGAO Project Manager.

Thank you for your participation in the review process and for helping to ensure the success of the NGAO Device Control Electronics Architecture.