

## **Keck Adaptive Optics Note 802**

### **Design Review Charge**

August 25, 2010

#### **REVIEW PANEL CHARGE**

The Director and Deputy Director (Directorate) of the Keck Observatory have established a panel of experts to assess the current state of the project to construct a system for the Observatory. The review panel will be provided with documentation describing the requirements, design, risk assessment, and the project plan and budget to completion. Using this material, in conjunction with a design review, the panel is asked to determine whether the project meets the success criteria and to make one of the following recommendations:

- The success criteria were completely met and the project is recommended to proceed as planned.
- The success criteria were partially met. The committee recommends that the project complete specific actions identified by the panel before proceeding.
- The success criteria were not adequately met. The committee recommends that the project should undergo a delta review to address the specific areas identified by the panel.

At the conclusion of the review, the panel is requested to provide the Observatory a verbal briefing of high priority concerns and recommendations. A written report of findings, recommendations and comments is requested within 2 weeks of the review. These written reports should be made directly to the Directorate of the Keck Observatory.

#### **SUCCESS CRITERIA**

Success for the design is judged by the whether the following have been accomplished:

1. The science cases developed for the system are compelling and competitive (not required for every project).
2. The scientific and technical requirements established for the system are sufficiently complete and consistent, to guide the development of the system.
3. A reasonable design that meets the scientific and technical requirements has been developed.
4. The risks associated with the design concept have been adequately assessed and the mitigation strategies are satisfactory.
5. The management plan, including cost and schedule, to complete the project, with emphasis on the next project phase, is viable and appropriate.

#### **DEFINITION OF THE DESIGN PHASES**

##### **System Design Phase**

The system design phase is the first phase in the WMKO development process. The principal objective of system design is to establish a design approach that meets the scientific and user requirements established for the system. The system design will establish an integrated engineering plan for the proposed design, evaluate the technical risks, explore trade-offs, and determine estimates for performance and cost to completion. The deliverables include: science

case requirements document, system requirements document, system design manual, systems engineering management plan and a system design report.

### **Preliminary Design Phase**

The preliminary design phase is the second phase in the WMKO development process. The preliminary design phase has two major objectives. The first objective is to deliver documented designs for each system, subsystem and component, hardware or software, of sufficient detail to establish through inspection and analysis the feasibility of the proposed design, and the likelihood that the design will meet the requirements. The second objective is to present the project plan to completion, including a detailed schedule and budget. The preliminary design deliverables include: requirements documents for key subsystems, an operations concept document, preliminary technical specifications, interface control documents and a preliminary design report.

### **Detailed Design Phase**

The detailed design phase is the third phase in the WMKO development process. The detailed design phase has two major objectives. The first objective is to deliver documented designs for each system, subsystem and component, hardware or software, with the required detail to support fabrication, assembly, integration and test. This includes detailed design drawings and bills of materials, the final technical specifications, and plans for assembly, integration, test, characterization, operations and operations transition. Compliance against the requirements should be demonstrated. The second objective is to present the project plan to completion, including a detailed schedule and budget.

## **KEY DESIGN REVIEW DOCUMENTS**

The following is a typical set of documents for a Keck design review. For smaller projects some of these items may be combined into fewer documents.

### **Requirements Document(s)**

The requirements include the science, system and functional requirements. This may be in the form of one or more documents.

### **Design Manual**

This is a complete high-level description of the design which may reference other documents or drawings for details. Performance analyses and budgets and appropriate simulations should be included. A high level requirements flowdown and a requirements compliance matrix should be provided for preliminary and detailed design reviews.

### **Risk Evaluation**

This document includes an evaluation of the programmatic and technical risks and their likelihood and impact, and the planned mitigation activities for each of these risks.

### **Management Plan**

The management plan (AKA Systems Engineering Management Plan) covers all of the elements needed to manage the project including the organization structure, responsibilities, product breakdown structure, work breakdown structure, cost estimate, schedule and staffing plan.