

Cassegrain ADC – Detailed Design (CD) Phase  
Project Work Plan: Revision 1.0

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## **1. Introduction**

The purpose of the Cassegrain ADC project is to provide an Atmospheric Dispersion Corrector that will fully compensate for effects of atmospheric dispersion down to a 60° zenith angle of the Keck 1 telescope for a wavelength range of 0.31 to 1.1 microns.

In February the Conceptual Design of that Cassegrain ADC was completed and reviewed. The CARA board approved start of the Preliminary Design Study in April 2003 and it was completed and reviewed in October, 2003.

This work plan deals directly with the next stage in a process that would involve: a Detailed Design (DD) that will complete the fabrication drawings. In this phase we would order the optical materials. Following a review and approval of the Detailed Design, the Fabrication phase would complete the instrument. The instrument would be Installed and Commissioned in the final phase.

## **2. Work Scope**

### 2.1. Instrument Specifications and Requirements

The Cassegrain ADC Requirements Document Version 1.3 defines the Instrument Specifications and Requirements to be followed in this phase

### 2.2. Telescope/Observatory Interface Control Document (ICD)

The Cassegrain ADC ICD Version 1.2, covers the Interface of this instrument to the telescope and infrastructure.

### 2.3. Optical Glass Purchase

The optical glass will be ordered from Corning in this phase, We have a quote for the material that will need to be updated shortly before the PO is finalized.

### 2.4. Detailed Mechanical Design

The mechanical design will be completed in this phase. We plan to have all fabrication drawings complete for the review at the end of this phase, and the purchased parts detailed to the point they can be ordered and the beginning of the fabrication phase.

### 2.5. Electrical Design

The electrical design will be complete with all schematics and wiring drawings. The hardware will be specified so that it can be ordered at the beginning of the fabrication phase.

## 2.6. Software

A complete prototype implementation ADC software will be ready at the end of the Detailed Design phase, including the ADC service dispatcher, client library, and engineering GUI. The prototype dispatcher will be written in Tcl/Tk to take advantage of its power as a rapid-prototyping tool. The work to be done after the Detailed Design phase is to make any modifications required as a result of testing and review, and rewrite the dispatcher in C, as per the ADC Requirements document.

## 2.7. Schedule

The schedule for this phase and the remaining project is attached. We plan to be ready for a review of the Detailed Design Phase work in March 04.

## 2.8. Budget

The project budget as it was estimated at PDR is attached.

## 3. Specifications

Defined in the ADC Requirements Document, Version 1.3

## 4. Project Team

Principle Investigator – Joe Miller  
Project Scientist, Optical Designer, and Deputy PI – Drew Phillips  
Optician – David Hilyard  
Mechanical Engineer – Vern Wallace  
Electronic Design – Barry Alcott  
Software – Will Deich  
Project Management – David Cowley  
CARA Instrument Program Oversight – Sean Adkins

## 5. Decision Matrix

- 5.1. The PI and the Deputy PI will make all performance decisions.
- 5.2. Staffing decisions will be made by the Project Manager in consultation with the PIs and CARA.
- 5.3. Budget decisions within the approved budget will be made by the Project Manager in consultation with the PIs and CARA.
- 5.4. Budget decisions exceeding the approved budget (including any expenditure of the contingency amount) must be approved by the CARA Instrument Program Manager.
- 5.5. Telescope interface decisions will be made by CARA through the Instrument Program Manager.

## **6. Risk and Contingency**

The technical and budget risks are considered low at this stage (CD) of the development. There is a 20% project contingency, but we do not expect to use any of this money during this phase.

## **7. Work Breakdown Structure**

### Preliminary Design Phase

1. Optical Glass Purchase
  - 1.1. Finalize optical material properties and specifications
  - 1.2. Receive CARA funds for optical material
  - 1.3. Write, submit, and issue PO
  - 1.4. Optical Material Delivery
2. Detailed Mechanical Design
  - 2.1. Detailed Design and fabrication drawings of attachment points
  - 2.2. Detailed Design and fabrication drawings of static structure
  - 2.3. Detailed Design and fabrication drawings of slides and ball screw translation system, detailed specification of bought parts
  - 2.4. Detailed Design and fabrication drawings of drive system, detailed specification of bought parts
  - 2.5. Detailed Design and fabrication drawings of prism cells and attachments to translation mechanism
  - 2.6. Detailed Design and fabrication drawings of covers
  - 2.7. Detailed Design and fabrication drawings of handling fixture(s), detailed specification of bought parts
  - 2.8. Detailed Design and fabrication drawings of electronics enclosure, detailed specification of bought parts
3. Electrical
  - 3.1. Detailed Specification of motor controller system
  - 3.2. Design of enclosure temperature control
  - 3.3. Control schematics
4. Software
  - 4.1. Specification of keywords
5. Preparation for Preliminary Design Review

## **8. Deliverables**

- Detailed Design Report
- Materials for the Critical Design Review
- Fabrication drawings
- Schematics and wiring diagrams
- Detailed specification of bought parts

## **9. Milestones**

- Start of Preparations for CD review Feb 04
- Critical Design Review March 04

## **10. Schedule**

The project schedule is included

## **11. Budget**

The proposed budget tracking sheet and cost codes are attached (attachment 2). A graph showing the rate of expenditures is also attached. This graph would be updated monthly at the time of the budget report and would include actual expenditures.

## **12. Project Tracking**

Monthly reports will be sent to the project team, SSC and CARA on about the 20<sup>th</sup> of each month. The report will include an update of the technical and budgetary status, and the schedule.

Monthly reports will be in a version of the new format requested by CARA as modified by agreement between the Project Manager and the CARA Instrument Program Manager.

## **13. Revision History**

Revision 1.0 Sept 16, 2003  
Revision 2.0 Nov 3, 2003