

Charge
Directors' Review of the Dark Energy Survey (DES) Project
December 11-13, 2007

This Charge is for a Directors' Review of the Dark Energy Survey (DES) project that will be held at Fermilab on December 11-13, 2007. The two primary objectives of DES are the successful deployment of DECam, a world-class astronomical instrument on the Blanco Telescope, for the benefit of the entire astronomical community served by NOAO; and the successful completion of the scientific program of the Dark Energy Survey. The review will cover the three parts of the DES project: the Dark Energy Camera (DECam), the DES Data Management (DES DM), and the Cerro Tololo Inter-American Observatory (CTIO) Facilities Improvement Project (CFIP). The Directors Hugh Montgomery, Fermilab; Richard Crutcher, National Center for Supercomputer Applications (NCSA) at the University of Illinois at Urbana-Champaign (UIUC); and Todd Boroson, National Optical Astronomical Observatory (NOAO) are commissioning this review.

The review will assess the readiness of the DECam portion of the project for a Department of Energy (DOE) Critical Decision 2 (CD-2) approval. In particular the committee will assess the design with regard to its ability to meet the Technical Requirements established as a result of the Conceptual Design.

The review will assess technical progress and plans for the DES DM portion of the project as documented in the DES DM Technical Design Report, The Technical Requirements and Specifications, and The Project Execution Plan. The Committee is asked to assess whether these documents properly support a new proposal for DES DM to be submitted to the National Science Foundation.

The review will assess the plan of the CTIO Facilities Improvement Project, which is described in the CFIP Project Execution Plan. The committee will also be presented with an overview of the process from DECam arrival to operations, and the integration of DES DM with the NOAO end-to-end (E2E) data management system.

More detailed descriptions of the Charge for the DECam and DES DM portions of the project are presented in sections A and B of the charge which follow. The committee is requested to review and comment on the management arrangements proposed separately for each part of DES and those set forth in the Joint Memorandum for the entire DES project. The committee is requested to comment on whether the cost and schedule estimates for DECam and DES DM are reasonable and whether they include adequate contingency. Constructive comments on presentation content, format, and style are also requested.

Finally, the committee is requested to present findings, comments, and recommendations at a closeout meeting with DES, Fermilab, NCSA/UIUC, and CTIO/NOAO management and provide a written report soon after the review.

A. Amplified Charge for the Director's CD-2/3a Review of the DECam Project (adapted from the charge for the Fermilab Director's Preliminary Review held October 30-31, 2007).

This review is to assess the DECam project's readiness for the Joint DOE/NSF Review that will look at all three parts of DES (DECam, Data Management and CFIP) which is currently scheduled for January 29-31, 2008.

The DES Collaboration proposes to build a new 519 megapixel CCD camera (DECam) to be mounted at the prime focus of the Blanco 4m telescope at CTIO. The DECam Project is hosted by Fermilab with contributions from several other labs and universities.

CD-2 is approval of the Performance Baseline. The Performance Baseline is developed from a design document (Preliminary Design or a Technical Design Report), a well-defined and documented scope, a resource-loaded detailed schedule, a definitive cost estimate, defined Key Performance Parameters, and some additional project management documents.

CD-3a is approval to start limited construction with DOE funds. DECam is requesting CD-3a and will present the scope of that work at the review. The committee is to review the CD-3a items presented and assure that all environmental, safety and security criteria will be met. DOE CD-3a approval provides authorization to complete the specified work.

The preliminary design needs to be developed to a level that the scope of the project is well defined. That scope is reflected in the Resource Loaded Schedule (RLS) and Cost Estimate. The cost and schedule baselines are based on a detailed Work Breakdown Structure (WBS), WBS Dictionary, Basis of Estimate (BOE), risk and contingency analyses, RLS, and time-phased funding and cost profiles.

The committee is asked to review each of these items for quality, completeness, and accuracy. The committee is also asked to review and assess the quality of and comment on the additional formal project management documentation provided in support of CD-2/3a. This assessment should also include DECam's responses to the 17 lines of inquiry (LOI) for a CD-2 Review.

As part of this assessment the questions listed in Attachment 1 of this charge should be addressed. Additionally the committee is to review and comment on the Project's response and actions taken on the recommendations from the Director's CD-1 Review of DECam on July 25-26, 2006, and the DECam-related recommendations from the DOE/NSF Technical, Cost, Schedule and Management Review conducted on May 1-3, 2007.

B. Amplified Charge for the Directors' Review of DES Data Management (DES DM) and DECam Simulations

A key part of the Charge for DES DM during this Directors' Review is to assess the quality and appropriateness of a new proposal to support the DES observing and scientific research program. The proposal for DES Data Management will be submitted to the NSF in mid December with Joe Mohr as Principal Investigator.

Besides the proposal to NSF, other documents will be made available to the committee for background, including: The DES Data Management System Technical Design Report; Technical Requirements and Specifications for the DES Data Management System; and DES DM Project Execution Plan.

As part of this assessment the questions listed in Attachment 2 of this charge should be addressed.

Attachment 1 - Charge Questions for the Directors' CD-2/3a Review of the DECam Project

Technical

1. Is the project scope well defined and supported by the preliminary design documentation, technical specifications and objectives?
2. Is the defined project scope reflected in the project cost and schedule?

Cost

3. Is the Work Breakdown Structure (WBS) appropriate for the project scope?
4. Do the cost estimates for each WBS (or cost) element have a sound documented basis and are they reasonable?
5. Does an obligation profile exist? How does it compare with the funding guidance?

Schedule

6. Is the schedule well developed and appropriately structured by specifying relationships, predecessors, successors, critical path, resource loaded, etc?
7. Are the durations for the activities and overall schedule reasonable and achievable with the assumed resources?
8. Does the schedule contain appropriate levels of milestones, sufficient quantity of milestones for tracking progress, and do they appear to be achievable?
9. Does the schedule include activities for design reviews, including assessment of readiness for procuring prototypes, preproduction and production materials?
10. Is there narrative which precisely defines the deliverable(s) required to satisfy the CD-4 Milestone?

Management

11. Is there an appropriate management organizational structure in place to accomplish the design and construction?
12. Is the organization structure well documented, and are responsibilities defined and appropriate for the scope of work?
13. Are there adequate staffing resources available or planned for this effort?
14. Is there a funding plan available or proposed to meet the resource requirements to realize the project?
15. Has a Risk Plan been developed, risks identified, risks analyzed, risk responses planned/implemented, risk monitoring/control process established and do they seem appropriate?

Procurement

16. Have the critical procurements been identified and are they included in the schedule with adequate lead time built in?
17. Have critical make vs. buy decisions been evaluated in conjunction with the scope and is that reflected in the baseline cost estimate, schedule and technical risk plan?
18. Are the project designs and procurement packages prepared to the degree appropriate to order materials and initiate construction as scheduled?

Attachment 2 - Charge Questions for the Directors' Review of the DES DM Project

1. Have the DES scientific requirements been translated into appropriate Technical Requirements and Specifications for the DES DM project, and are the Technical Requirements and Specifications clearly stated and documented for this stage of the project?
2. Are the technical specifications and requirements sufficiently well developed to define the scope of the DES DM project?
3. Does the scope of the DES DM project as presented in the Technical Design Report meet the project's objectives (mission need)?
4. Will the science-ready data products that will be produced with the DES data management system from DECam data support the needs of the key project science working groups?
- 5.a Will the Community Pipeline allow the general astronomical community to use DECam for their science projects?
- 5.b Will the processed DES data distributed by the DES DM system enable the astronomy community to carry out science projects with DES data?
6. Are the resources (level of effort and computing resources) proposed by the DES DM team sufficient to carry out the development and commissioning phases of the project and does the DES DM team have the size and skills required to carry out the project as proposed?
7. Can the development phase of the DES DM be carried out in time for the start of the commissioning of DECam?
8. Is the DES DM operations plan adequate to ensure successful processing, archiving and distribution of DES data at the level required to support DES scientific analyses?
9. Have the recommendations from the NSF/DOE Review of DES in May 2007 been adequately addressed?