

Charge for the Large Synoptic Survey Telescope Annual Progress Review August 27–30, 2019, Tucson, AZ



The National Science Foundation (NSF) Division of Astronomical Sciences (AST) and the Department of Energy (DOE) Office of High Energy Physics (HEP) will jointly conduct a Progress Review of the Large Synoptic Survey Telescope (LSST) Project from August 27 to 30, 2019, in Tucson, Arizona. The purpose of this review is to conduct the annual assessment of the construction project status and future plans as well as an assessment of the planning and execution of the activities during the commissioning phase. The review will be conducted to conform to both NSF and DOE requirements for annual progress reviews. In parallel, there will be a separate Earned Value Management System (EVMS) surveillance review covering only the NSF-funded activities (see Appendix).

Construction of the LSST Project is jointly supported by NSF and DOE. The NSF is the lead agency, funding construction of the telescope, site facilities, data infrastructure, systems engineering, and education and public outreach capabilities, with an award from the Major Research Equipment and Facilities Construction (MREFC) program restricted by the National Science Board not to exceed \$473 million. The DOE-deliverable portion of the LSST Project is the imaging camera system with a total project cost of \$168 million funded as a Major Item of Equipment project. With private support of \$39 million, the full construction cost is \$680 million.

Commissioning preparations and activities began in fiscal year (FY) 2018 and are being planned and executed by the construction project team. Support for commissioning phase activities is included in the MREFC project funded by NSF. The corresponding activities on the DOE side are supported by an operations funding line as they are not included in the Camera MIE project.

The LSST facility is scheduled to begin its full 10-year survey operations on October 1, 2022. Ramp-up of pre-operations activity began in FY 2019; the pre-operations activities and funding are part of a separate planning exercise.

The LSST Project is organized by Work Breakdown Structure (WBS) under the headings "1. Project Management Office," "2. Data Management," "3. Camera," "4. Telescope and Site," "5. Education and Public Outreach," and "6. Systems Engineering and Commissioning." The Project is managed as a unified, single project across NSF- and DOE-funded scope. It has a complex organization, in part because it is supported by two separate federal agencies with different policies and procedures. The panel is asked to consider throughout this technical, cost, and schedule review, how well the integrated project management is working, and to draw attention to any interface issues they may identify.

The LSST Project will share all necessary documentation with the review panel through a Web-based repository, available at least one week before the review starts. This will include the Project Execution Plan, which contains the performance baseline against which success is to be measured. We expect that prereview communications with the panel by both the LSST Project and the Agencies will be by email.

Edward Ajhar is the NSF program manager for LSST and will serve as the NSF AST contact for the review. Helmut Marsiske is the DOE program manager for the LSST Camera and will serve as the HEP contact for the review. Kathy Turner is the DOE program manager for LSST Camera commissioning and operations.

The review panel is requested to prepare a closeout presentation for the project, containing their major recommendations, which will be given on the last day. The full written report should be submitted to both agencies within 60 days of the review.

Charge to the Panel for the Progress Review

Considering the LSST project's performance to date and the execution plan for the future, including technical scope, cost, schedule, and the safety and risk management plans, can the facility be constructed and commissioned as planned, and is the project effectively coordinating its activities with the pre-operations team?

The panel should answer the following questions, as noted under primary numbering and in bold-face. Wherever possible, any identified shortcomings should be accompanied by recommendations that the panel believes will correct the problem. Although there are specific questions in this charge, the panel is asked to examine project activities broadly and to draw attention to any issue they should happen to notice, even if it does not appear in this charge.

1. Is the LSST project progressing as planned, and are they making appropriate plans for future construction and commissioning work?

Are all activities consistent with the baseline project objectives as described in the Project Execution Plan? Is there adequate progress and planning across all Work Breakdown Structure (WBS) elements, including both in-house efforts and external procurements and contracts? Are there appropriate plans for realizing opportunities and for mitigating risks? Are the plans for assembly, integration, test, and commissioning phases complete, achievable, and well understood by the commissioning team?

2. Are the current cost and schedule (C&S) performance and their future trends acceptable?

Are the budgets and contingencies for the full scope of the NSF deliverables and DOE deliverables covered by each agency's funding plans? Do the performance to-date and C&S trends give confidence that the project can complete successfully on time and within budget? Is there adequate reporting for both funding agencies? Have changes to the Project Management Control System (PMCS) been properly incorporated? Is the change control process solid and is it being followed correctly?

3. Is the project management functioning well?

Are there clear lines of authority and responsibility? Are the interfaces between DOE- and NSF-supported activities managed appropriately? Are new risks being uncovered and are identified risks being actively mitigated and/or retired? Are there concerns over the distributed nature of the second level WBS teams and how well they are communicating and working together? Does the systems engineering team monitor progress and performance across the project using proper methodology? Is the systems engineering documentation being suitably created and refined as the project progresses? Are all necessary written procedures in place, documented, and followed? Are contracts and procurements properly monitored? Is the project staffing adequate for the work?

4. Is the planning for the transition to operations adequate for this stage of the project?

Will essential materials, including manuals, maintenance plans, test reports, and as-built drawings, be ready when needed? Is planning for the transition of personnel sufficiently developed and being appropriately communicated to staff?

5. EPO: Are the Education and Public Outreach activities properly planned and executed?

Is the EPO team the right size with the right skills? Is it engaged and integrated as appropriate?

6. ES&H: Are Environment, Safety & Health (ES&H) issues managed appropriately?

Does the project have an acceptable safety record? Are Integrated Safety Management Principles being followed?

7. Has the project responded satisfactorily to recommendations from previous reviews?

Appendix

NSF is conducting a separate but parallel surveillance review of the project's EVM System used for the NSFfunded scope of the project, excluding the DOE-supported items. (EVM Systems at the DOE labs undergo separate reviews). This review ensures that the NSF-accepted EVMS is being maintained, and continues to provide reliable project performance data.

The EVMS Surveillance is the process of reviewing the implementation and use of the accepted EVMS processes and procedures for the project. The 2019 Surveillance Review seeks to accomplish three goals:

- Confirm implementation of EVMS changes in response to the August 2018 review and assess effectiveness.
- Review LSST Project Team's adherence to their EVMS processes and procedures in accordance with the LSST Project Controls documentation.
- Review the timeliness, accuracy, and reliability of project performance data provided by LSST.

All process categories of EVM will be considered during this system surveillance with a focus on two of the five process categories. This EVMS surveillance will be based upon the remaining work and content that is specific to the guidelines being reviewed. The surveillance will address the content of the LSST Project Controls System Description with focus on changes from the August 2018 review and the accuracy of the EVM system over the last three months.

The outcome will be a written report to be submitted to the NSF Program Officer by October 31, 2019. Although NSF-focused, this report will be shared with DOE.