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LSST Camera Value Management Plan

1. <u>Change History Log</u>

Revision	Effective Date	Description of Changes
А	3 March 2010	CD-1 Version
В	21 Oct 2014	Released CD-2 per LCN-1364.

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3. <u>Acronyms</u>

- CD-x Critical Decision x = version
- ICD Interface Control Document
- I&T Integration and Test
- LSST Large Synoptic Survey Telescope
- SLAC SLAC National Accelerator Laboratory
- TBD To Be Determined
- TBR To Be Resolved

4. <u>Applicable Documents</u>

- [1] DOE Order 413.3B (29 November 2010), "Program and Project Management for the Acquisition of Capital Assets"
- [2] OMB Circular A-131
- [3] LCA-226, LSST Camera Project Management Plan

5. <u>Purpose and Scope</u>

The LSST Camera Value Management Plan is described in this document. It meets the requirements for DOE Order 413.3B (29 November 2010), "Program and Project Management for the Acquisition of Capital Assets" and Office of Management and Budget (OMB) Circular A-131 which "requires Federal Departments and Agencies to use value engineering (VE) as a management tool, where appropriate, to reduce program and acquisition costs".

The goal is to use this plan as a management tool in the execution of major project alternatives. Value management will be focused on those project development alternatives that have progressed to the level requiring serious consideration and investigation.

6. <u>Value Management Program Overview</u>

6.1. Introduction to Value Management

Value Management (VM) methodology is also known as value analysis, value engineering, or value planning. VM is defined as an organized effort directed at analyzing the functions of systems, equipment, facilities, services, and supplies for the purpose of achieving the essential functions for a project at the lowest life-cycle cost consistent with required performance, quality, reliability, and safety. VM is a collaborative technique directed toward analyzing the functions of an item or process to determine "best value" or the best relationship between worth and cost. The VM Program is an integral part of the overall project delivery process and is not a separate entity designed to "second guess" the Integrated Project Team or design authority. The VM process is a standard engineering practice that was chosen to be a management tool that helps meet project objectives while providing the maximum value for the entire system.

6.2. Value Management Program Organization

Hard copies of this document should not be considered the latest revision beyond the date of printing. The VM program is the responsibility of the Project Manager to ensure that an effective program has been established. A VM team is established to carry out the preparation for this study and follow through with the documentation of major alternatives considered for the project.

6.3. Introduction

The goal of the value management process is to create value for the investments in the development of the LSST Camera System. To mitigate prohibitive costs, only major alternatives are to be executed through this plan. Detailed engineering design alternatives are addressed in daily activities and will continue to be summarized in design reviews. Those standard engineering decisions that have limited impact on cost, or are not cross-cutting in scope, and have no major impact on the science mission, will not be covered in this plan.

Documentation for decisions and design solutions prior to CD-0 will not be retroactively subjected to the same methodology as later alternatives. Those alternatives will instead be collected and summarized, providing a discussion of prior options that were made at that time.

The VM study has three major stages: Functional Analysis, Alternatives Analysis, and Implementation. These stages are further divided into a total of eight specific phases corresponding to the current stage of the project. The Functional Assessment Stage progresses from a Preparation Phase through an Investigative Phase to final Functional Analysis Phase. Alternatives Analysis begins with a Creative Phase followed by Evaluation and Development Phases. Once the Implementation Stage has been reached, VM will focus on Presentation and Post-Study Phases.

These are discussed in more detail in Section 6.4. Collectively they will provide the team with guidance in determining high-cost areas in the design and assist in developing alternative solutions for consideration.

6.4. Functional Assessment

6.4.1. <u>Preparation Phase</u>

The Preparation Phase will provide information that is relevant to the scope of the VM study. The Preparation Phase will focus on current design decisions with an overview of the project and its operational requirements. Major alternatives considered prior to CD-0 will be addressed.

6.4.2. <u>Investigative Phase</u>

6.4.3. <u>Functional Analysis Phase</u>

Key to the VM process in the function definition and analysis. This is the primary activity that separates VM from all other "improvement" practices. Functions are identified and classified as either basic or secondary. The components are examined in terms of their function. From this a logic diagram can be created. Known as a Function Analysis System Technique (FAST), these diagrams are tools used to analyze the functions within the scope under study. The diagrams show the "why" and "how" something is done.



The results generated by the function analysis process are assigned costs and/or other measurement criteria. Items that have a high potential for added value are identified for further consideration in the Creative Phase of the Alternatives Analysis Stage (Section 6.5.1).

6.5. Alternatives Analysis

6.5.1. <u>Creative Phase</u>

During this phase, the team will develop and list creative ideas for performing each function selected for the study. The participants of this study will identify as many concepts as possible that provide the necessary functionality. The VM team suspends any substantial evaluation or judgment of ideas but instead focuses on looking for a significant number of ideas and the association of them to the goal of VM.

6.5.2. Evaluation Phase

The Evaluation Phase will systematically reduce the pool of ideas generated during the Creative Phase to a few concepts that could meet the project's objectives. The resulting potential alternatives are then evaluated with regard to their perceived benefits, advantages, and risks.

A weighted criteria key will be developed in order to evaluate the potential alternatives and each idea be given a total rating number. Ideas rated positively will be developed further and documented on the Value Engineering alternative forms.

Below is an example of a rating index:

- 5) *Improves Cost & Performance*: the project will benefit greatly. Significant Cost and/or significant functional improvements.
- 4) *Improves Cost or Performance*: will improve the project. Some cost and/or other functional improvements.
- 3) *Technically Feasible*: but will require additional analysis to verify if cost and/or functional improvements are possible. May challenge design criteria. Needs further development.
- 2) Scope reduction: will reduce cost, but at the expense of the project performance.
- 1) Significant disadvantages: drop from consideration.

6.5.3. <u>Development Phase</u>

The objective of the Development Phase is to select and prepare the "best alternative(s)" for improving value. The selected alternatives are developed into viable, efficient, and cost-effective proposals.

The development process could include, but is not limited to: using team member expertise; consultation with the project staff; experts and outside vendors; polling others by survey or other means; and review of other information resources. Every attempt is made to fully develop the life cycle cost model to determine the impact of each proposed alternative on the project cost and schedule. An implementation plan is produced that includes the proposed schedule of all implementation activities, team assignments and management requirements.

6.6. Implementation

6.6.1. <u>Presentation Phase</u>

In this phase, the VM study team presents its recommendations to the LSST Camera Project management. Through the presentation and its interactive discussions, the alternative ideas will either be:

- approved and given the "go ahead" to proceed with implementation,
- given direction for collecting additional information, or,
- rejected on the basis of some or all of the recommended alternatives by management.

6.6.2. <u>Post-Study Phase</u>

Following the VM study, the VM specialist completes the final written study report and sends it to the team members and management. The staff coordinating the Value Study activities, including the VM Team members if needed, assists and monitors the evaluation to help all parties in implementing the added value features. The final estimates of the value of proposals are established.

Following the VM study, a VM report will be generated and distributed to the team members and LSST Camera Project management. The report will incorporate the alternatives developed and the final estimates on the proposals.

Each alternative must be independently designed and confirmed, including contractual changes, if required, before its implementation into the product, project, process, or procedure.

6.1. VM Forms

The following VM forms shall be used to document the process.

• LCA-427, Value Management excel form with Guider as an example.