Large Synoptic Survey Telescope Camera System Plan	Document # **LCA-00227-B**		Status LSST Camera APPROVED Effective Date: 18 Sept 2014
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Document Title

LSST Camera Quality Implementation Plan

1. Change History Log

Revision	Effective Date	Description of Changes
A	14-Oct-2011	Initial release. See notice LCN-002.
B	18-Sept-2014	Revised and updated for CD-2 Review. See notice LCN-1131. Added Darren Marsh to author list; removed unused acronyms; 4. Applicable Documents: [1] DOE Order 414.1D was rev C; eliminated Ref. [5] (contents of document included in Ref [4]); removed Ref.'s [11] MIL-STD-882D, [12] "SLAC Assurance Program Description," and [13] ISO 9001 since they were uncited. 6. Quality Assurance Program: updated Figure 1 Org Chart; split Performance and Safety Assurance Manager position into two positions: Safety Officer and Quality Assurance Manager and added roles and responsibilities for each; 8. Quality Improvement: clarified that nonconforming items are segregated by the group responsible for the work; 9. Control of Documents and Records: clarified that quality records shall be stored at their source institution or in a common database; 12. Design: expanded on design validation process to include validation of design bases generated by computer programs 13. Procurement: clarified that Certificates of Conformance must be stored at the originating institution or in a common database 16. Independent Assessment: "Project Management Assurance" was "Project Management Oversight Group;" removed 16.1 and reference to SLAC Safety Oversight Committee reviews—this group has been disbanded and all safety reviews have been incorporated into the design review process laid out in Section 12.6;

2. Contents

3. Acronyms

3.1. Acronyms

ALD	Associate Laboratory Director
DOE	Department of Energy
ES&H	Environment, Safety, and Health
ISEMS	Integrated Safety and Environmental Management System
LSST	Large Synoptic Survey Telescope
PPA	Particle and Particle Astrophysics
QA	Quality Assurance
QC	Quality Control
QIP	Quality Implementation Plan
SLAC	SLAC National Accelerator Laboratory
S/CI	Suspect or Counterfeit Item

4. Applicable Documents

[1] DOE Order 414.1D, "Quality Assurance"

[2] LCA-226, "LSST Camera Project Management Plan"

[3] SLAC-I-720-70100-100, "SLAC Environment, Safety, and Health Manual"

[4] LCA-138, "LSST Camera Performance and Safety Assurance Plan"

[5]

[6] DOE G23.1.1-1, "Occurrence Reporting and Performance Analysis"

[7] LCA-39, "LSST Camera Configuration Management Plan"

[8] LCA-38, LSST Camera System Engineering Management Plan"

[9] SLAC-I-720-0A21B-001-R004, "SLAC Worker Safety and Health Program"

[10] LCA-98, "LSST Camera Design Review Plan"

5. Purpose and Scope

This LSST Camera project Quality Implementation Plan (QIP) is based upon and reflects the project's understanding and approach to the requirements and intent of Ref [1], DOE Order 414.1D, "Quality Assurance," thus meeting the contract requirement of the DOE with Stanford University for a documented Quality Assurance (QA) program.

The purpose of this QIP is to introduce quality assurance plans by which the LSST Camera project manages the development, fabrication, assembly, and testing of project deliverables to meet contract requirements and regulations. It includes references to other documents used in the management of the project, which are included by reference in the scope of this QIP

This QIP applies to all work involved in the development, fabrication, assembly, and testing of the LSST Camera, at all institutions where this work is carried out. By extension, it also is applied to subcontractors as well as in involvement of Camera project personnel in support of LSST observatory activities.

6. Quality Assurance Program

6.1. Introduction

The goal of the LSST Camera quality assurance program is to provide mechanisms for controlling activities that affect product quality, or protect the environment and health and safety of both the public and personnel involved with the project. These mechanisms are intended to establish a graded approach to quality assurance, invoked to the extent consistent with the importance of the activity.

Not all items, processes, activities, and services have the same effect on health and safety, reliability, environmental protection, or program objectives. Therefore, such a graded approach acknowledges the importance in establishing the applicability of aspects of the QIP to specific activities and to the degree to which they need to be applied. Considerations include:

The relative importance to safety, safeguards, and security

Compliance with SLAC and other institutional Policies and Regulations

LSST Camera project mission and programmatic impact

The objective of this graded approach is to ensure that activities affecting quality are managed through adequate systems and procedures that are commensurate with the complexity and hazards of the work being performed. LSST Camera project management and cognizant managers are responsible for identifying the activities that are subject to these requirements, and for carrying out an analysis to justify the degree of rigor to be applied.

6.2. QA Policy

All LSST Camera staff members and collaborators are responsible for providing our stakeholders with products and services of appropriate quality and functional integrity.

6.3. Organization

Figure 1 shows the organization of the LSST Camera project. Four offices play key roles in implementing the plans and directives established in this document: Project Management, Performance and Safety Assurance, Systems Integration, and Subsystem Managers. The roles, responsibilities, and authorities of managers in each are discussed in the following section.

When these key project personnel are absent. they shall delegate authority and power to another project individual to act on their behalf.

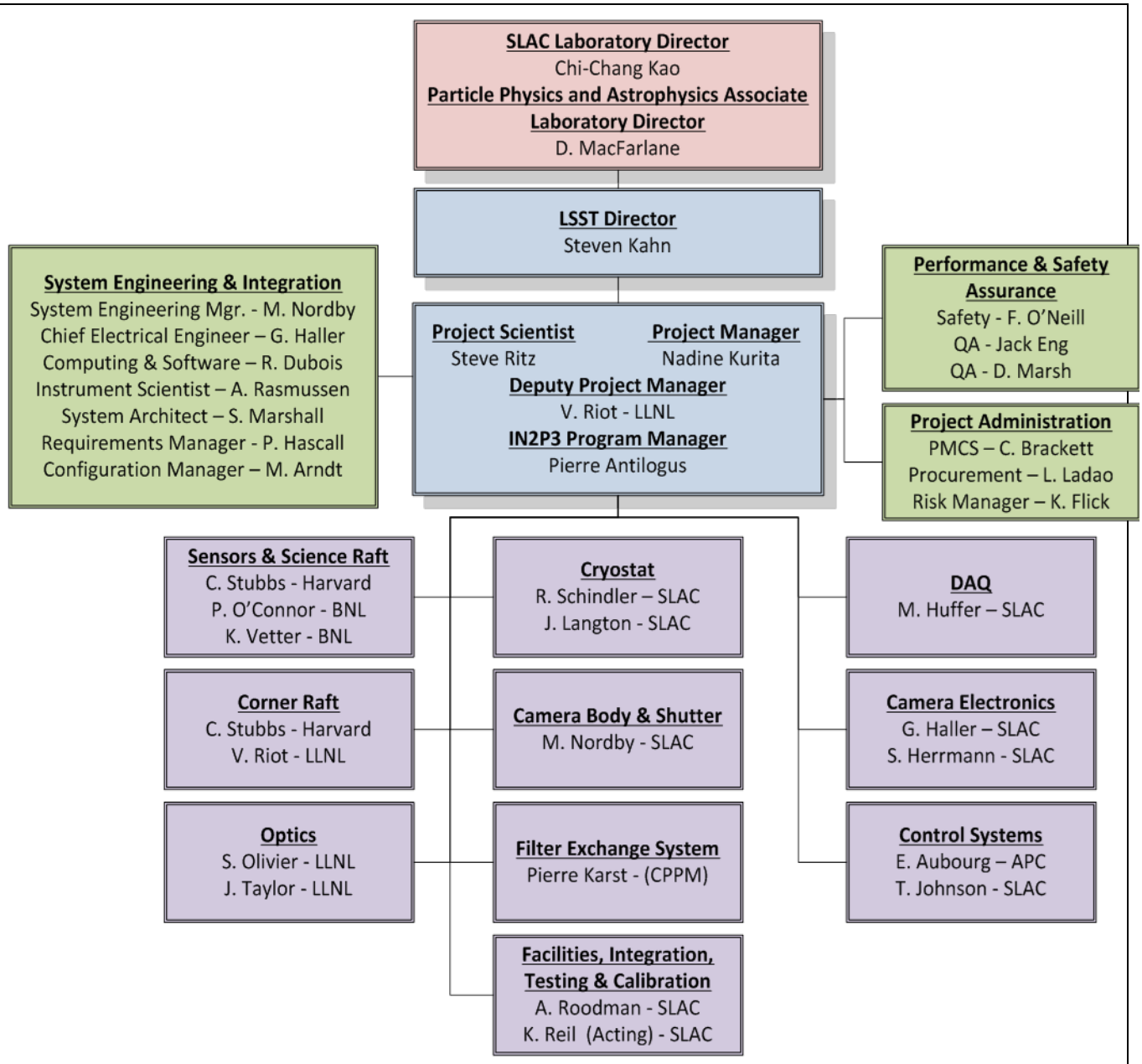

Figure 1: Organization chart for the LSST Camera project

6.4. Responsibilities and Authorities

6.4.1. Project Manager

The Project Manager has overall project management authority. The Project Manager is responsible for project planning, for achieving project cost, schedule, and quality objectives, for compliance of all environment, safety and health (ES&H) procedures, and for coordinating the activities of the project. In addition, the Project Manager approves staffing plans and actions.

The Project Manager also approves this QIP and associated management plans and implementing procedures. Other responsibilities and duties of the Project Manager are described in the Ref [2], the "LSST Camera Project Management Plan."

6.4.2. Safety Officer

The Camera Safety Officer reports directly to the Project Manager, with an appointment by the Associate Laboratory Director (ALD) for Particle and Particle Astrophysics (PPA) at SLAC. The Safety Officer is responsible for:

- Maintaining this QIP and referenced documents that form a part of the ES&H and system safety program
- Providing consultation to Project Manager and Subsystem Managers in implementing established ES&H and system safety procedures and policies (e.g.: supporting subsystem or institutional safety programs, establishing review procedures)
- Providing or coordinating project-specific safety training for project members
- Working with the Project Manager and Subsystem Managers to avoid situations where safety may be at risk of being compromised due to cost, schedule or other constraints
- Stopping any work that indicates inadequate consideration for personnel or system safety or impact on the environment.
- Performing safety audits as requested by the Project Manager

6.4.1. Quality Assurance Manager

The Quality Assurance Manager reports directly to the Project Manager, with an appointment by the Associate Laboratory Director (ALD) for Particle and Particle Astrophysics (PPA) at SLAC. The Quality Assurance Manager is responsible for:

- Maintaining this QIP and referenced documents that form a part of the quality program
- Providing consultation to Project Manager and Subsystem Managers in implementing established QA procedures and policies (e.g.: developing subsystem or institutional vendor control programs, establishing review procedures)
- Providing or coordinating project-specific QA training for project members
- Coordinating completion of QA-related milestones as provided in project schedules
- Working with the Project Manager and Subsystem Managers to avoid situations where completion of critical planned QA activities are compromised due to cost, schedule or other constraints
- Recommending to the Project Manager that work be stopped based on an investigation that indicates that work is of inadequate quality
- Performing QA audits as requested by the Project Manager
- Participating individually or as part of a team in vendor surveys, vendor qualifications, and source inspections

6.4.2. Systems Integration Manager

The Systems Integration Manager reports directly to the Project Manager, and is responsible for the technical management of the project. This includes managing the implementation of programs that fulfill specific aspects of the quality implementation plans described in this document. The Systems Integration Manager has authority to execute these plans and flow them down to all Camera subsystems, but does so as a service to the Project Manager. Ultimately, the Project Manager is responsible for assuring that the implementation of all such plans meet the expectations and requirements established in this QIP.

6.4.3. Subsystem Managers

The project Subsystem Managers are responsible for ensuring the implementation of QA practices and procedures in accordance with this QIP and its referenced plans. They are supported by the QA Manager, Safety Officer, and Systems Integration Manager, but ultimately are responsible for their subsystem, regardless of the institution or subsystem.

Responsibilities of other key project personnel are further described in the Ref [2].

6.5. Stop Work Authority

6.5.1. Relating to Work of Inadequate Quality

Any individual involved in the project who becomes aware of an activity or workmanship that he or she believes to be of inadequate quality should bring the condition(s) to the attention of the their supervisor. It is the responsibility of the supervisor to investigate the condition(s) believed to be of inadequate quality, to communicate the problem to the Project Manager, and to take appropriate corrective actions based on the condition(s). Project management has the authority to stop work of inadequate quality if deemed appropriate. The role of the QA Manager with respect to making recommendations to stop work of inadequate quality has been previously described in Section 6.4.2.

6.5.2. Relating to Hazardous Operations or Conditions

The policy on stop work authority relating to hazardous operations or conditions is provided in Chapter 1 of Ref. [3], the "SLAC ES&H Manual." This policy is interpreted to include stop work authority for any project supervisor or any member of the project team. Issues relating to stop work based on potentially hazardous operations or conditions shall be communicated to the Camera Safety Officer or institutional safety officer.

7. Personnel Training and Qualification

7.1. Training and Job Proficiency

The training program for project personnel consists of required and recommended training commensurate with the scope, hazards, and complexity of their job functions, to assure proper understanding of the specific principles, techniques, and requirements of their assigned tasks. The responsible supervisor or manager establishes, by means of a position description, the minimum requirements with respect to education, experience, and other initial qualifications, for positions that require performance of quality-affecting activities. The supervisor/manager makes a determination of the candidates' initial qualifications as compared with the minimum requirements.

Training is provided by qualified instructors using formal classroom sessions, required reading assignments, hands-on workshops, and other applicable training methods or combinations of methods. Periodic retraining (or ongoing training) is conducted to maintain job proficiency and to improve performance.

The program also includes job-specific and task-specific ES&H training and certification. Required training depends on the institution and subsystem tasks and safety hazards involved. Ref. [4], the LSST Camera "Performance and Safety Assurance Plan" describes the minimum requirements for Institutional Safety Implementation Plans, which include a description of the ES&H training requirements for all personnel working on the LSST Camera project at that institution. These safety plans address the type and degree of training required and a description of the system for managing training logs. These programs must meet the minimum requirements of institutional ES&H plans.

ES&H training for subcontractors and employees of agencies that provide skilled persons for short term employment by SLAC shall be coordinated through the Safety Officer.

7.2. Training Status Monitoring

Institutional Safety Implementation Plans describe the method by which local training status is monitored. This includes training requirements based on the identified hazards, required courses and frequency of re-training, status and completion dates for all required training, and a method to flag when training periods expire and re-training is required. These systems may use institutional training databases or a custom system for LSST Camera project work.

For staff and project personnel visiting SLAC, the ES&H Training Database is used to track identified required training, status of training, and completion dates of the training. The database is monitored by the QA Manager and Safety Officer, who will provide the point of contact for all off-site project personnel working at SLAC. For SLAC personnel, supervisors are responsible for ensuring that their staff complete all required training.

8. Quality Improvement

8.1. Introduction

It is the project's intent that all personnel be continually alerted to this project's QA program objectives of preventing conditions and situations that may compromise the successful accomplishment of the technical, scientific, and ES&H goals and obligations of the project. There should be a continually improving level of quality in meeting these goals and obligations with the participation of everyone in the early identification, documentation, and remedy of problems that might result in excess costs or schedule delays, among other consequences.

Project management encourages a "no fault" attitude regarding the identification of problems that compromise either safety or reliability.

8.2. Corrective Action

Action will be taken, as appropriate, to rectify and prevent recurrence of significant conditions adverse to quality or environment, safety, and health. Quality-related information will be reviewed and data analyzed to identify items or processes needing improvement. The decision to initiate any corrective

action will also be based upon an evaluation of the seriousness, and the adverse cost and schedule impact of the problem relative to the cost and difficulty of its correction.

The primary responsibility for eliminating or minimizing defective elements and nonconforming articles, and for correcting conditions which have or would initiate these problems rests with the individual group responsible for performing the tasks or producing the articles. The cognizant manager is responsible for seeing that all appropriate corrective actions are adequate and taken in a timely manner. If the cognizant manager or QA Manager believes that a correction is not adequate or timely; the problem will be documented and brought to the attention of the Project Manager for resolution.

Further details and procedures of the project's corrective action plans are described in Ref. [4], the "LSST Camera Performance and Safety Assurance Plan." This Plan applies to all institutions involved in developing, fabricating, or testing hardware for the Camera.

8.3. SLAC Occurrence Reporting

Incidents which are required to be reported in accordance with Ref [6], DOE G23 1 .1-1, "Occurrence Reporting and Performance Analysis", are a source of data regarding quality improvement opportunities. Occurrence reporting for more significant failures are handled pursuant to institutional occurrence reporting structures. At SLAC, reporting, investigation, and resolution are conducted in accordance with the provisions of the SLAC Workbook for Occurrence Reporting.

8.4. Segregation of Nonconforming Items

Items that do not meet requirements shall be segregated by the group responsible for performing the work, and placed into a designated holding area until their proper disposition can be determined. When segregation is not possible or impractical, other precautions are to be taken to preclude inadvertent use or start-up of such equipment, including locking-out and tagging, or visibly marking the equipment.

Procedures for dispositioning nonconforming items are detailed in Ref. [4], the "LSST Camera Performance and Safety Assurance Plan."

8.5. Disposition and Tracking of Quality Problems

Subsystem Managers shall expedite the disposition of quality problems and track and verify the completion of the authorized improvement or corrective actions. Corrective action includes efforts to correct similar conditions and to preclude recurrence of the deficiency or problem. A root cause, or lessons-learned analysis may be performed commensurate with the significance of the problems.

The QA Manager shall bring to the attention of the Project Manager all quality-related problems with significant impact on the project for development of a corrective action plan.

8.6. Improvement Teams

Improvement teams may be appointed by the Project Manager to work on resolving significant problems or on improving operations. These teams may be composed of persons from several groups. They may address either general process problems (e.g.: procurement process delays, or lack of coordination of design activities), or specific issues related to a particular hardware element or process. These groups will be led by a facilitator appointed by the Project Manager.

9. Control of Documents and Records

9.1. Introduction

The preparation, issuance, use, and change of project documents that specify quality requirements or prescribe activities affecting quality shall be controlled to assure that correct documents are being employed. This includes documents such as travelers, procedures, drawings, and procurement specifications. Such documents, and any revisions, shall be reviewed for adequacy and approved for release by authorized personnel.

The plans and procedures for managing the configuration of the LSST Camera documents are detailed in Ref [7], the "LSST Camera Configuration Management Plan." This defines the documents under the plan, including requirements, quality-related design documents, and records, as well as the processes for controlling them through their entire life cycle.

9.2. Preparation

Documentation shall be initiated and prepared in accordance with the procedures, standards, and requirements of the parent organizations from which project personnel originate. Furthermore, documents must meet the minimum requirements established by standards established by the project in Ref [8], the "LSST Camera System Engineering Management Plan," and documents reference therein.

9.3. Approval

Documents requiring configuration control will be approved by a pre-set list of approvers, depending on the scope and type of document. Records are included in this process, since they are also included as quality-related items requiring control. Approval authorities and approval processes are described in Ref [7], for both documents and records.

9.4. Revision

Changes and revisions to controlled documents are reviewed and approved by the same organization that originally reviewed and approved the documents. The revision and change control process is described in Ref [7], along with the process for tracking rationale and justification for the changes using change control documents. This process includes provision for so-called red-line changes that are needed for addressing immediate changes.

Revisions and their status constitute the change history of a document, so all are retained. However, only one revision is identified as the approved and released revision.

9.5. Distribution

Access to, and distribution of the latest approved revision of controlled documents is managed as part of the configuration management process described in Ref [7]. The official version of documents and records are those stored in the on-line document archive system, so it is the responsibility of the document user to assure that he or she has the latest version of a document.

For project plans and those affecting broad sets of project personnel, Ref [7] describes the means to ensure that revisions to these documents are distributed to all personnel. In short, responsibility for disseminating updates to project plans and standards lies with Subsystem Managers. The document

archive system includes provisions for distributing updated revisions, but the Subsystem Managers must ensure that all personnel affected by such revisions are informed.

9.6. Records Management

The documented evidence of the quality of completed work is retained for use during the course of an activity as well as for historical records. These are included as configuration items and controlled pursuant to Ref [7]. Sufficient records are required and maintained to furnish objective evidence of actions affecting quality. The QA records must be legible and traceable to the phase of the activity, and to the item, process or operation they apply to. The records shall be stored at their source or in a common database, and retrievable for use in evaluation of acceptability and for verification of compliance with the QA program requirements.

Computer files shall be regularly backed up and proper storage techniques used to prevent loss or damage to quality-affecting records.

10. Work Processes

Work performed on the project is regarded in terms of processes. Each work process consists of a series of actions planned and carried out by qualified workers using pre-specified work processes and equipment under administrative, technical, and ES&H controls to achieve an end result. In accordance with the integrated safety and environmental management system (ISEMS) described in Ref [9], the Camera project commits to assuring that the following are clearly identified and conveyed to workers in every work process description, prior to beginning work:

Requirements for the work and final product (ISEMS Core Function 1)

Acceptance criteria applicable to the work and final product (ISEMS Core Function 1)

Hazards associated with the work (ISEMS Core Function 2)

Technical standards applicable to the work and final product (ISEMS Core Functions 1, 3)

Safety, administrative, technical, and environmental controls to be employed during the work (ISEMS Core Function 3)

Camera managers are responsible for assuring that those under their supervision have the skills (including knowledge and understanding of the capabilities of the processes being used), equipment, work process documents, and resources needed to accomplish their work. Workers shall be responsible for the quality of their work and shall be expected to perform their work correctly the first time, in accordance with established instructions and procedures (ISEMS Core Function 4).

Drawings and procedures are quality records in that they form part of the definition of the work process to be performed. As described in Section 9, above, they are maintained in accordance with Ref [7].

11. Identification and Control of Parts and Components

11.1. Identification and Control

All parts and component assemblies shall be uniquely identified in one of three ways, as determined by the cognizant engineer and reviewed by the Subsystem Manager or designee. First, parts or components deemed suitably unique or complex will use a unique serial number to distinguish them from all others. Second, piece-parts or bulk parts of particular importance can be identified by lot number or some other identifier distinguishing unique manufacturing runs or material information. Third, bulk parts can be identified solely by manufacturer or project part number, signifying the drawing, processes, and materials with which the part was manufactured.

Control of part inventorying and use is accomplished in a way consistent with the way in which the part is identified.

Ref. [4], the "LSST Camera Performance and Safety Assurance Plan," describes in more detaile the criteria to be used in establishing the level of identifier needed for parts, as well as the options for identifying and marking parts.

11.2. Handling, Storage, and Shipping

Handling, storage, cleaning, packaging, shipping, and preservation of items shall be controlled, as appropriate, to prevent damage or loss and to minimize deterioration. These activities shall be addressed as applicable by the cognizant engineer in specifications, drawings, procedures, instructions or other documents, as appropriate to the items affected. Manufacturers' written recommendations, instructions, or manuals shall be requested and followed for purchased materials and equipment.

11.3. Suspect/Counterfeit Items

Line managers must be cognizant of the presence of suspect/counterfeit items (S/CIs) in their work processes. A suspect item is one in which there is an indication by visual inspection, testing, or other information that it may not conform to established government or industry-accepted specifications or national consensus standards. A counterfeit item is a suspect item that is a copy or substitute without legal right or authority to do so, or one whose material, performance, or characteristics are knowingly misrepresented by the vendor, supplier, distributor, or manufacturer. The use of suspect/counterfeit items can lead to unexpected failures and undue risk of mission impacts, environmental impacts, and personal injury, contamination, or death.

To mitigate the use of suspect/counterfeit items in work processes, line managers must implement SLAC's Policy and Procedure for Controlling S/CI's, as described in Ref. [4]. The controls include:

Guidance on identifying S/Cl's

Procurement procedures to prevent the purchase of S/CI's

Detection and disposition of S/Cl's from facilities and installed equipment

Reporting requirements for discovered S/CI's

12. Design

12.1. Introduction

The design shall be defined, controlled, validated, and verified. Applicable design inputs shall be appropriately specified on a timely basis and correctly translated into procedures, specifications and drawings. These design output documents shall be proposed, completed, reviewed, and approved in accordance with other sections of this QIP and standards, procedures, and practices defined in Ref [8], the "LSST Camera System Engineering Management Plan." Designs shall be validated through activities such as independent technical reviews, peer reviews, alternate calculations, and qualification testing.

These major steps of the design process are controlled by procedures defined in plans referenced in the sections below.

12.2. Design Input

Design inputs, defined as information that places requirements or constraints on the design, shall be identified and documented, and their selection reviewed and approved. Design input shall be specified to the level of detail necessary to permit the design activity to be carried out in a correct manner and to provide a consistent basis for making design decisions, accomplishing design validation and verification measures, and evaluating design changes. Inputs may include the following:

Performance and functional requirements

Reliability, cyclic lifetime, or uptime requirements

Codes and standards

Health and safety standards

Constraints imposed by interface agreements

Documents containing any such design input are considered configuration items, since they affect the design, and must be reviewed along with the design itself, pursuant to Section 12.6, below, and controlled according to procedures defined in Ref [7], the "LSST Camera Configuration Management Plan."

12.3. Interface Control

Designs that are impacted by interfaces with other components outside the control of the designer's subsystem shall rely on interface control documents to define the nature of the interface and impact on the design of interfacing components. Processes for managing interfaces and defining interface control documents are detailed in Ref [8], the "LSST Camera System Engineering Management Plan."

12.4. Design Outputs

Design output documents shall be prepared to support risk or hazard assessments, procurement, manufacturing, assembly, testing, inspection, or maintenance, as applicable. The completed design is recorded in design documents such as drawings, procedures, or test, inspection, or maintenance processes. Required inspections and tests for acceptance shall be specified in design output documents. Design output documents shall be relatable to design input with documentation in sufficient detail to permit design validation.

12.5. Design Validation

Design validation is the process for assuring that the design complies with requirements. Design validation methods can include technical reviews, alternate calculations, and qualification testing. The extent and number of design validation methods is based on a graded approach and is dependent upon the design product's complexity and its importance to safety and project success. The particular design validation methods used shall be identified and documented, along with the results of the design validation. Design validation shall be performed or reviewed by technically knowledgeable individuals other than those who performed the design. If a design is modified to resolve validation findings, the modified design shall be validated prior to release for use.

Computer programs used to provide data that serve as the design basis of a structure, system, or component will be verified and validated. The verification process will demonstrate that the computer program produces correct solutions for the encoded mathematical model within defined limits for each parameter employed. The validation process is to show that the encoded mathematical model produces a valid solution to the physical problem associated with the particular application

Typically, design validation activities are reviewed as part of the design review process described in Section 12.6, below.

12.6. Design Reviews

Design reviews provide assurance that the design meets all specified requirements and constraints with adequate margin, within the established cost constraints, and in a manner deemed at a suitably low level of risk. Where applicable, design reviews shall address the following questions:

Were the design inputs correctly selected?

Were appropriate design methods and computer programs used?

Were the design inputs correctly incorporated into the design?

Is the design output reasonable compared to the design inputs?

Have suitable materials, parts, processes, and inspection and testing criteria been specified?

Specifics of the design review process and required deliverables for each phase of design review are described in Ref [8], and detailed in Ref [10], the "LSST Camera Design Review Plan," and referenced documents.

12.7. Computer Software

Requirements for design, development, and control of computer software are described in Ref [4].

12.8. Configuration Control

Both design input and design output documents are considered configuration items, since they affect the ultimate implementation of components of the project. Furthermore, validation and review documents are considered records since they support decisions and approvals in the design process. These documents and records shall be controlled according to the principals established in Section 9, above, and Ref [7]. Changes either to input or output documents shall follow the processes delineated in Ref [7], to assure that the rationale and impact of the changes are captured, reviewed, and approved.

13. Procurement

13.1. Introduction

Procurements from vendors under a purchase order or subcontract are accomplished in accordance with institutional procurement policies. Procurement planning is an essential and integral part of the procurement process and includes determination of the anticipated QA requirements and Quality Control (QC) activities for a particular procurement. Specific procurement procedures and requirements are further detailed in Ref. [4], the "LSST Camera Performance and Safety Assurance Plan."

13.2. Selection and Evaluation of Vendors

Potential suppliers of critical, complex, or costly items or services shall, prior to the award of a contract, be evaluated in accordance with predetermined criteria, to ascertain that they have the capability to provide items or services that consistently conform with the technical and quality requirements of the procurement. The determination of which suppliers shall be evaluated will be made by project technical personnel, in conjunction with the QA Manager and the institutional buyer or contracts specialist.

The evaluation may be based upon the results of one, or a combination of, the following methods:

Review of the supplier's quality history with the institution or collaborators

Survey or evaluation of the adequacy of the supplier's quality system

Review of the supplier's quality history in providing the same or similar items or services

13.3. Procurement Documents

It is essential that documents included in the procurement package be controlled per Section 9 of this QIP and that, unless they are clearly marked "preliminary", they shall be current and approved by the proper authority. The cognizant manager is responsible for assuring that applicable design documents and other technical and quality requirements are included or referenced in a specification, statement of work, or purchase order for purchased items and services. The QA requirements specified for a given procurement are based upon considerations of safety, programmatic importance, complexity and intended application of the item or service.

Procurement documents shall be reviewed and approved by the appropriate group leader as necessary for ensuring correct identification of items and their conformance to the required technical quality specifications.

Changes to procurement documents shall be reviewed and approved by the same organizationally responsible persons that approved the original procurement document. The procurement office has the responsibility to ensure that the contents of the procurement documents are accurately and correctly transferred to the relevant contract or purchase order.

13.4. Inspection, Testing and Surveillance

When necessary for the evaluation of the quality of an item or service, the vendor or LSST camera organization, as appropriate, is requested to provide inspection and/or test reports. The cognizant technical representative reviews these reports and determines the acceptability of the data contained in the reports.

13.5. Certificates of Conformance

When certificates of conformance are required from vendors, the requirement is specified in the procurement documents. Mill certificates of chemical and physical analysis are required for raw materials and fasteners used in fabrication of items affecting quality. Certificates of conformance may be requested from vendors producing items to project specifications or drawings when other quality verification methods are not employed.

All such certificates of conformance, along with all other quality records delivered by contracted vendors, are stored by the originating LSST institution or in a common database, as described in Section 9.6.

13.6. Nonconformances

Subcontractors and project personnel are responsible for identifying non-conforming work or items. Any completed work or items not meeting the drawings, specifications and contract requirements are to be deemed nonconforming. In the event a nonconformance cannot be readily corrected, the identified nonconformance is to be submitted to the procurement manager. The nonconformance submittal must detail the area of the problem, and cite from the drawings. specifications or contract, how or why the work does not conform.

In the case where a nonconformance cannot be corrected to allow requirements to be met, procurement officers will be notified.

14. Inspection and Acceptance Testing

14.1. Inspection

Subsystem Managers or engineers determine when inspections and tests are necessary to determine the quality of a process or product. Such inspections and tests should be conducted in a manner that assures conformance to established criteria. The results of inspections and tests are used as a basis for acceptance by a comparison with approved acceptance criteria provided or referenced by the purchase order or other documentation. The signature of the responsible individual indicates acceptance of inspection and test results.

If source surveillance is performed at a vendor facility, the surveillances shall be performed at intervals consistent with the importance and complexity of the item or service. Source surveillance includes monitoring, witnessing, or observing selected activities. Source surveillance shall be performed in accordance with written plans. Upon acceptance of the item during source surveillance, documented evidence of acceptance of source verification shall be furnished to the QA Manager, the procurement office, and the vendor. Acceptance of an item during source surveillance does not relieve the vendor of its quality responsibilities.

If receiving inspection is used, purchased items shall be inspected as necessary to verify conformance to specified requirements, taking into account source surveillances and audit activities and the demonstrated quality performance of the supplier. Receiving inspection shall verify by objective evidence such features as configuration, identification, dimensional, physical, and other characteristics, freedom from shipping damage, and cleanliness. Receiving inspection shall be coordinated with review of supplier documentation when procurement documents require such documentation to be provided prior to receiving inspection.

Acceptance of services, such as third-party inspection services or engineering and consulting services shall be by one of the following methods:

Technical verification of data produced

Surveillance and/or audit of the activity

Review of objective evidence for conformance to the procurement document requirements.

14.2. Test Control

Tests required to verify conformance of an item to specified requirements and/or to demonstrate that items will perform as intended in service are planned and documented in test procedures or instructions. The characteristics to be verified or tested and the methods to be employed are specified. Test results are to be documented as specified in the test specification documents. Results of tests performed to verify designs are reviewed and evaluated by the cognizant manager or engineer.

14.3. Control of Measuring and Test Equipment

It is the responsibility of managers to ensure that test equipment is appropriately calibrated. Calibration and control measures are not required for commercial equipment when such equipment can provide the required accuracy without calibration. Records shall be established and maintained to indicate calibration status and the capability of measuring and test equipment to satisfactorily perform its intended function.

14.4. Test Records

Inspection reports, test results, and testing travelers are all quality records in that they demonstrate compliance of a component to established requirements. As records, they shall be controlled pursuant to Section 9 and Ref [7].

15. Management Assessment

15.1. Self Assessment

The quality assurance objectives that are outlined in this QIP shall be regularly monitored by the QA Manager on behalf of, and routinely reported to, the Project Manager. In addition, the project Safety Officer will conduct random surveillance of project activities to assure that ES&H requirements are being met by project personnel and subcontractors. The QA Manager and Safety Officer will report directly to the Project Manager to assure that appropriate corrective actions are implemented for any deficiencies that are discovered.

In particular, project management shall rely upon and evaluate line management and supervisor's routine observations and survey of their group's accomplishment of assigned quality-affecting activities. Line management and supervisors shall take an active role in seeking excellence and improving performance. They shall encourage personnel to look for ways to improve performance and correct problems as an integral part of the normal work routine.

15.2. Project Reviews

The Project Manager is committed to an on-going program of project reviews, as addressed in Section 12.6 and detailed in Ref. [10]. Results of project reviews will be used to identify, correct, and prevent management problems that hinder the achievement of the project's objectives.

16. Independent Assessment

16.1. SLAC Project Management Assurance Review

Since SLAC is the lead DOE facility responsible for the execution of the LSST Camera project, the SLAC Project Management Assurance (PMA) process advises SLAC and project management on the development of the project through its phases. The committee is expected to meet monthly to review the project.

16.2. Department of Energy Review

The LSST Camera is subject to DOE status reviews approximately every six months for the duration of the project.