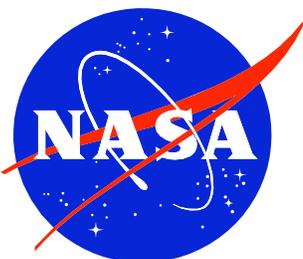


**GAMMA-RAY LARGE AREA
SPACE TELESCOPE
(GLAST)
PROJECT**

**CONFIGURATION
MANAGEMENT
PROCEDURE**

MARCH 12, 2001



**———— GODDARD SPACE FLIGHT CENTER ————
GREENBELT, MARYLAND**

GAMMA-RAY LARGE AREA SPACE TELESCOPE
(GLAST)

PROJECT

CONFIGURATION MANAGEMENT PROCEDURE

MARCH 12, 2001

NASA Goddard Space Flight Center

Greenbelt, Maryland

GLAST Project Configuration Management Procedure

Approved by:

ORIGINAL SIGNED

3/13/01

Scott Lambros
GLAST Project Manager

Date

TABLE OF CONTENTS

1.0	Purpose	1
2.0	References	1
3.0	Scope	1
4.0	Definitions	2
5.0	Authorities and Responsibilities	3
6.0	Configuration Identification	3
6.1	Process Definition	3
6.2	Identification Criteria	4
6.3	GLAST Project CI Identification	4
7.0	Configuration Control	6
7.1	GLAST Project Controlled Documentation	6
7.2	Configuration Change Classifications	7
7.3	Configuration Change Requests (CCRs)	7
7.4	Deviations and Waivers	10
7.5	Configuration Control Board (CCB)	11
7.6	Document Change Notice (DCN)	14
7.7	Contractual Implementation of Approved CCRs	15
8.0	Configuration Status Accounting	15
9.0	Configuration Verification	15
9.1	Configuration Management Audit	15
9.2	Audit team	16
9.3	CMO Responsibility	16
10.0	Developer Configuration Management	16
11.0	Requirements Traceability	16

Figures

Figure 1.0	CCR Process	9
Figure 2.0	CCB Levels	12

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

ACRONYMS

CCB	Configuration Control Board
CCBD	Configuration Control Board Directive
CCR	Configuration Change Request
CDR	Critical Design Review
CDRL	Contract Deliverable Requirements List
CI	Configuration Item
CM	Configuration Management
CMO	Configuration Management Officer
CO	Contracting Officer
CSA	Configuration Status Accounting
DCN	Documentation Change Notice
DPM	Deputy Project Manager
DPMR	Deputy Project Manager for Resources
DRL	Deliverable Requirements List
GDMS	Goddard Directives Management System
GPG	Goddard Procedures and Guidelines
GSFC	Goddard Space Flight Center
IRD	Interface Requirements Document
MAR	Mission Assurance Requirements
MCDL	Master Controlled Document List
MOA	Memorandum of Agreement
MOU	Memorandum of Understanding
NASA	National Aeronautics and Space Administration
OPS	Operations
PDL	Product Design Lead
PDR	Preliminary Design Review
PG	Procedures and Guidelines
PROC	Procedure
QMS	Quality Management System
RQMT	Requirement
SAM	System Assurance Manager
SOW	Statement of Work
SPEC	Specification
SRD	Science Requirements Document
SRR	System Requirements Review

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

1.0 PURPOSE

This document establishes and describes Configuration Management (CM) policies and procedures used by the National Aeronautics and Space Administration (NASA) Goddard Space Flight Center (GSFC) Gamma Ray Large Area Space Telescope (GLAST) Project. This document also defines the objectives, applicability, and responsibility for implementing and maintaining a CM system for the GLAST Project and satisfies the requirements of the GPG 1410.2.1 and 400-PG-1410.2.1.

This CM Procedure establishes organizational responsibilities for implementing the CM system, top-level policies for configuration identification, configuration change control, configuration status accounting, and configuration verification.

This formal CM system is intended to assure:

- Definition of all documentation required for product design, fabrication, test, and performance.
- Correct and complete descriptions of the approved configuration. Descriptions include specifications, drawings, parts lists, test procedures, and operating manuals.
- Traceability of the resultant product and its parts to their descriptions.
- Accurate and complete identification of each material, part, subassembly, and assembly that goes into the product.
- Systematic evaluation of proposed changes to an approved configuration and control of implementation of these changes.
- Accurate and complete accounting of all changes to product descriptions and to the product itself.

2.0 REFERENCES

NASA/GSFC Documents:

GPG 1410.1	Directives Management
GPG 1410.2	Configuration Management
GPG 1440.7	Control of Quality Records
400-PG-1410.1.1	Directives Management for Flight Programs and Projects
400-PG-1410.2.1	Configuration Management
400-PG-1440.7.1	Control of Program and Project Records

3.0 SCOPE

This procedure establishes the requirements for the implementation of CM on the GLAST Project. This document is applicable to the GLAST Project, contractors under direct contract to the GLAST Project, and all agencies who have signed a Memorandum of Understanding (MOU), Memorandum of Agreement (MOA) or any other agreements with the GSFC or NASA for the development of the GLAST Project.

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

The requirements and procedures listed herein are applicable to all flight and ground system hardware and their associated documentation.

4.0 **DEFINITIONS**

Class I Changes – A Class I change occurs when one or more of the following items is affected: 1) baselined documentation (except for typographical errors, simple clarification, or other examples of Class II documentation changes); 2) technical requirements contained in the product CI (form, fit, function); 3) contract end items/requirements (cost or schedule); 4) interfaces; 5) technical allocations e.g., weight, power, data rate; 6) technical risks; and 7) science performance. All proposed Class I changes are submitted for CCB approval.

Class II Changes – A Class II change is a change that does not fall within the definition of a Class I change. Examples of Class II changes are: 1) a change in documentation only (such as correction of errors, addition of clarifying notes or views); 2) a minor change in hardware (such as substitution with an approved alternative material) which does not affect any item listed under Class I changes; and 3) drawing changes that do not affect a baseline or interface. A Class II change does not require project CCB review unless it is written against CM-controlled documents.

Configuration Audits – an audit by an organization of the effectiveness of its CM processes, either internally or of its contractor(s).

Configuration Baseline – configuration of a product or service, formally established at a specific point in time, which serves as a reference for further activities.

Configuration Change Request (CCR) – a documented request to issue, change, revise, or delete a controlled document.

Configuration Control – the element of CM concerning the systematic proposal, justification, evaluation, coordination, and disposition of approved baselines and changes, and the implementation of approved changes to baseline documentation and products (CIs).

Configuration Control Board (CCB) – a board composed of designated individuals who review and recommend approval or disapproval of proposed baseline Configuration Items and changes, revisions, or cancellations thereto.

Configuration Documents – documents that define requirements, design, build/production, validation, and interfaces of a product or service and require document control action before the document can be issued or altered in any way.

Configuration Item (CI) – hardware, software, processed materials, services, or any discrete portions thereof, designated for CM and treated as a single entity in the CM process.

Configuration Identification – Configuration Identification consists of the technical documentation that identifies and describes the product and its component parts throughout the design development, test, and production tasks. It also applies to identification of changes and product markings.

Configuration Management (CM) – a systematic process for establishing and maintaining control and evaluation of all changes to baseline documentation, products (CIs), and

subsequent changes to that documentation which defines the original scope of effort. The systematic control, identification, status accounting, and verification of all Configuration Identification throughout its life cycle.

Configuration Status Accounting (CSA) and Reporting – Configuration accounting is the activity that produces records and reports of CI descriptions and all changes to the CI. It includes the recording and reporting of significant information needed to effectively manage CIs. This includes such activities as maintaining the Master Controlled Documents List (MCDL), status tracking of Configuration Change Requests (CCRs), status of CCB activities, and the subsequent reporting of such information to personnel and organizations associated with the Project.

Configured Article List – Configured Article List (CAL) describes all CIs, critical item hardware and software, and supporting documentation by which the exact configuration definition of the hardware and software can be determined.

Deviation – a specific written authorization, granted prior to the manufacture or testing of an item, to depart from a particular performance or design requirement of a specification, drawing, or document.

Master Controlled Documents List (MCDL) – an organization’s list of controlled documents, as described in the organization’s document control procedures.

Product Design Lead (PDL) – The manager or leader with overall responsibility for managing the design activity, managing the technical and organizational interfaces identified during design planning, and where required, forming and leading the Product Design Team. The term refers to flight project managers, mission managers, instrument managers, subsystem technical managers, integrated product development team leaders, lead engineers, etc.

Waiver – a specific written authorization, granted after the manufacture or testing of an item, to depart from a particular performance or design requirement of a specification, drawing, or other document, but is considered suitable for use “as is”.

5.0 AUTHORITIES AND RESPONSIBILITIES

The GLAST Project Manager is responsible for ensuring that the GLAST Project performs the configuration control functions necessary to meet the requirements of the GSFC and NASA. The GLAST Project Manager will designate a CM Officer (CMO) responsible for oversight and coordination of Project configuration control activities.

6.0 CONFIGURATION IDENTIFICATION

6.1 PROCESS DEFINITION

Configuration Identification refers to the process of identifying components to be managed as CIs and designating the technical documentation (including requirements, design, hardware and software, specifications, drawings, manuals, and operational procedures) for each baseline developed. Configuration Identification involves allocating required capabilities to CIs, naming and numbering the items and developing or acquiring technical documentation to describe them.

6.2 IDENTIFICATION CRITERIA

As products are developed new CIs will be identified and included as appropriate into the organization's baseline. One or more of the following criteria should be applicable to be considered an appropriate selection as a CI:

- Be critical to overall system performance, safety or security.
- Have a specification or top-level assembly drawing.
- Be maintainable and operable as a separate entity and therefore allocable to more than one location.
- Be acquirable in the assembled condition as a subsystem or system-level spare.
- Be capable of separate qualification and/or acceptance testing.
- Be an operational project used in direct real-time support of a mission or system objective.
- Be an off-line project if one of the following conditions apply:
 - The status of the project affects product schedules.
 - Changes to the configuration of the project directly affect the configuration of other CIs.
 - The development or maintenance of the project requires a large expenditure of resources.
 - Be a Commitment or Agreement.

6.3 GLAST PROJECT CI IDENTIFICATION

Baseline CIs (documents) will be incorporated into the MCDL. The MCDL will contain, as a minimum, the document number, document title, revision indicator, effective date, change number and name of responsible document lead. New documents and proposed changes to the established baseline documents will be systematically reviewed and evaluated for technical, cost and schedule impact prior to approval or disapproval of the change request. Determination of documents to be put under control and baselined to be included on the MCDL will be by the GLAST Project Manager (or designee) at his/her discretion.

For all new releases and revisions issued after the effective date of this document the following footer shall be placed on the cover indicating where to confirm the proper revision status:

“CHECK THE GLAST PROJECT WEBSITE AT <http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.”

6.3.1 Document Identification

All Quality Management System (QMS) directives are controlled using the online Goddard Directives Management System (GDMS). All other documentation is controlled using the

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

GLAST CM System. All changes to controlled baseline documents, including GDMS documents, must have a CCR and be submitted to the GLAST CCB for disposition.

6.3.2 Document Numbering

A document identification number is required in order to submit a document into the CM system, if not intended for inclusion in the GDMS, and shall be assigned to all internally controlled documents by the CMO prior to submitting the document to the CCB for initial release.

The numbering scheme for GLAST-prepared internal documents shall consist of the organization code, document category (see table below), a four (4) digit number assigned sequentially, and (if applicable) a revision letter (issued sequentially), i.e., 433-SPEC-0003B. The following document types, when originated by the GLAST Project shall be controlled. This list is provided for guidance only and is subject to change by the Project Manager.

Category	Description	Criteria
CDRL	Contract Deliverable Requirements List	Always
DRL	Deliverable Requirements List (non-contract)	Always
FORM	Forms	By decision
ICD	Interface Control Documents	Always
IRD	Interface Requirements Documents	Always
LIST	Lists	By decision
MAR	Mission Assurance Requirements	Always
MOA	Memorandum of Agreement	Always
MOU	Memorandum of Understanding/Interagency Agreement	Always
PLAN	Plans	By decision
PROC	Procedures	By decision
RQMT	Requirements Documents	Always
SOW	Statements of Work	Always
OPS	Operations Documents	Always
SRD	Science Requirements Documents	Always
SPEC	Specification Documents	Always

GLAST Project spacecraft and instrument providers shall utilize their own document/drawing numbering system in accordance with their internal procedures.

In addition to the permanent document identification number, the cover sheet for all GLAST-generated controlled documents will include, as a minimum, the document title, name and organization code of the responsible organization, and an approval/effective date. All documents must have a change revision sheet identifying the changes along with the current revision.

6.3.3 Configuration Baselines

The GLAST Project Configuration Baselines will be established at these major project milestones:

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

- The GLAST Project requirements baseline will be established at SRR.
- The design baseline is established at the PDR.
- The development baseline is established at the CDR.
- The product baseline is the final as-built configuration of a delivered CI.

7.0 CONFIGURATION CONTROL

Configuration control is the systematic coordination, evaluation, decision, and release of proposed and approved changes to an established baseline. The objective of configuration control is to ensure that changes are properly and completely defined and presented in such a way that the project can consider the cost, schedule, and performance impacts of a proposed change, and can control change implementation. For documents, the initial release and subsequent change proposals shall be submitted for review and approval to the GLAST CCB using a CCR form. Deviations and waivers are also reviewed and dispositioned by the CCB and/or the PDL/QA Representative, as appropriate.

7.1 GLAST PROJECT CONTROLLED DOCUMENTATION

The GLAST CMO will maintain all documentation that is placed under CM control. The latest version of the approved baseline document is available on the GLAST MCDL. The user shall always check the GLAST MCDL to verify the correct version of the document prior to use. Any GLAST Project controlled documents that have not been formally baselined will be marked "DRAFT". The "Draft Documents in Review" location in the GLAST Project web site will be used to facilitate the review of GLAST Project "Draft" documents.

7.1.1 Document Release

All GLAST Project-controlled documents must be formally released with the issuance of a CCR. A new document is released through the formal change control procedure as defined in this document. A notice will be sent out by the CMO when a new or changed document is released with a reminder that superseded/cancelled versions are not to be used.

The process of submitting new documents to the GLAST Project CM Office includes the proper assignment of document numbers, baseline identification, and document submission. When a document is ready to be baselined, the electronic version of the document shall be delivered to the GLAST CM Office in MS Word format. A CCR form along with the proposed original document will be available on the GLAST CM System for cognizant CCB members for review.

All baseline CM controlled documents require the approval of the GLAST Project Manager or designee, via the CCB process. Once the GLAST CCB has approved the document for release, the GLAST CM Office shall convert the document into a PDF file. All documents shall be stored electronically and made accessible to project personnel via the web in the GLAST MCDL. The document will be considered approved once CCB members and the chair approve the CCR. CM technical publications will begin upon CCB approval.

When documents are released and published on the GLAST MCDL, appropriate personnel will be notified via e-mail. Each document will have its own specific standard distribution list, which will be maintained by the CM Office.

7.1.2 Document Revisions

A revision is a complete reissue of a document. Identification numbers for revised documents will be the original identification number followed by a sequential revision letter. Each revised document will include all changes that have previously been approved. No editorial or other changes shall be made during revisions unless approved by the CCB.

7.1.3 Superseded Documents

In the event that a document has been superseded or cancelled by another document, the superseded document shall be clearly marked as "SUPERSEDED" or "CANCELLED" and may be retained in the Project Library for historical purposes.

When a document is superseded or cancelled, notification will be sent to the Project personnel via e-mail. Documents that are cancelled or become superseded will be indicated as such on the MCDL.

7.1.4 Electronic Files for Superseded Documents

Electronic files of superseded documents are stored in a separate location to provide assurance against unintended use. No one has privileges to access these files except the CM Office.

7.2 CONFIGURATION CHANGE CLASSIFICATIONS

Class I changes impact form, fit, function, cost, or schedule of a design item that has reached a baseline point. Class I changes require a CCR. Configuration changes may affect hardware, software, firmware, verification requirements and the documents, drawings and procedures defining them. Class II changes are changes of an editorial nature, minor corrections, or changes that do not affect interchangeability. Developers will submit Class II changes to the cognizant GLAST Project PDL for verification of classification.

7.3 CONFIGURATION CHANGE REQUESTS (CCRs)

7.3.1 Initiating a CCR

All GLAST Project CCRs can be submitted using the GLAST online CM system. Anyone that wants to initiate a proposed change to a GLAST Project controlled document must coordinate the change with the respective document lead. CCRs submitted against GLAST Project controlled documents will be prepared and sponsored only by the document leads. The MCDL identifies the responsible document lead for each GLAST CM controlled document. If the responsible document lead is unavailable or unable to sponsor a CCR, another document lead can sponsor the CCR for them.

The CMO will assist the sponsor in assembling the CCR package. The CCR package consists of the CCR, proposed document change pages and backup information (if needed). The CCR package is forwarded to the CMO through the online database system to begin the process. Engineering Change Proposals (ECPs), deviations and waivers submitted by external

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

participants (i.e., contractor, agency) will be submitted to the GLAST CMO, processed under the cover of a GLAST CCR form and sponsored by the cognizant document lead.

At a minimum, the CCR must contain the following information:

- Initiators name, organization code, and e-mail address.
- Date submitted.
- Title and number of document.
- Effectivity (e.g., specific documents and/or hardware affected).
- Revision/change (letter and/or number of document to be changed).
- Complete technical description of proposed change(s), including specific referenced document(s) and document rewording necessary to effect the change.
- Complete rationale for proposed change(s).
- Change priority: routine, urgent, or emergency.
- Cost and delivery impact.
- Schedule for completion, anticipated impact on the overall schedule, and the reason therefore.
- Procurement requires the "Procurement Change Order Classification".

The CCR sponsor is required to prepare a CCR that will include the appropriate information and proposed change pages. The sponsor submits the CCR and forwards the electronic file of the proposed change pages and any backup information to the CMO.

7.3.1.1 Change proposal priority

The CMO (in conjunction with the CCR sponsor) shall recommend a priority to the proposed change. The final priority is determined by the CCB Chairman. Three priority levels shall be used:

Emergency. This priority shall be assigned when failure to implement a change in operational characteristics may seriously compromise the effectiveness of the equipment or when a hazardous condition exists that may result in fatal or serious injury or extensive damage or destruction of the equipment. Emergency changes shall be dispositioned within 24 hours of receipt. CCRs identified as "Emergency" will immediately be brought to the CCB Chairman's attention and a CCB meeting will be convened as soon as possible.

Urgent. This priority shall be used to effect a change that, if delayed, would cause schedule slippage or cost increase. Urgent changes shall be dispositioned within ten business days of receipt.

Routine. This priority shall be used when the conditions specified in the Emergency and Urgent priorities do not exist. Normal changes shall be dispositioned within twenty business days of receipt.

7.3.1.2 Cost Estimates

Cost estimates are required of every proposed CCR. When a proposed change has a cost impact, a ROM will be required as part of the CCR. In addition, the impact assessment statement must include positive, negative, and/or no impact assessment, as appropriate. The

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

CCR sponsor is required to analyze the ROM for accuracy. For CCRs with a high cost impact, an in-house estimate may need to be included as part of the CCR package.

7.3.2 Online CM System

An online CM system for preparing, submitting and reviewing CCRs will be accessible to the Project through the GLAST web site. CCRs can be drafted and reworked online before submitting the final version to the CMO for processing. CCRs will be reviewed online using the GLAST CM system and all reviewer comments will be submitted electronically to the CM office.

7.3.3 CCR Process

The Project CMO is responsible for processing a proposed change throughout the CCR lifecycle (see figure 1.0 for the CCR process flow). The GLAST CM System notifies the CMO when a new CCR is entered into the database. The CMO will retrieve this information from the database and begin processing. The CMO will check to ensure all affected requirements are identified and assess the CCR for completeness, accuracy and verify baseline integrity. The

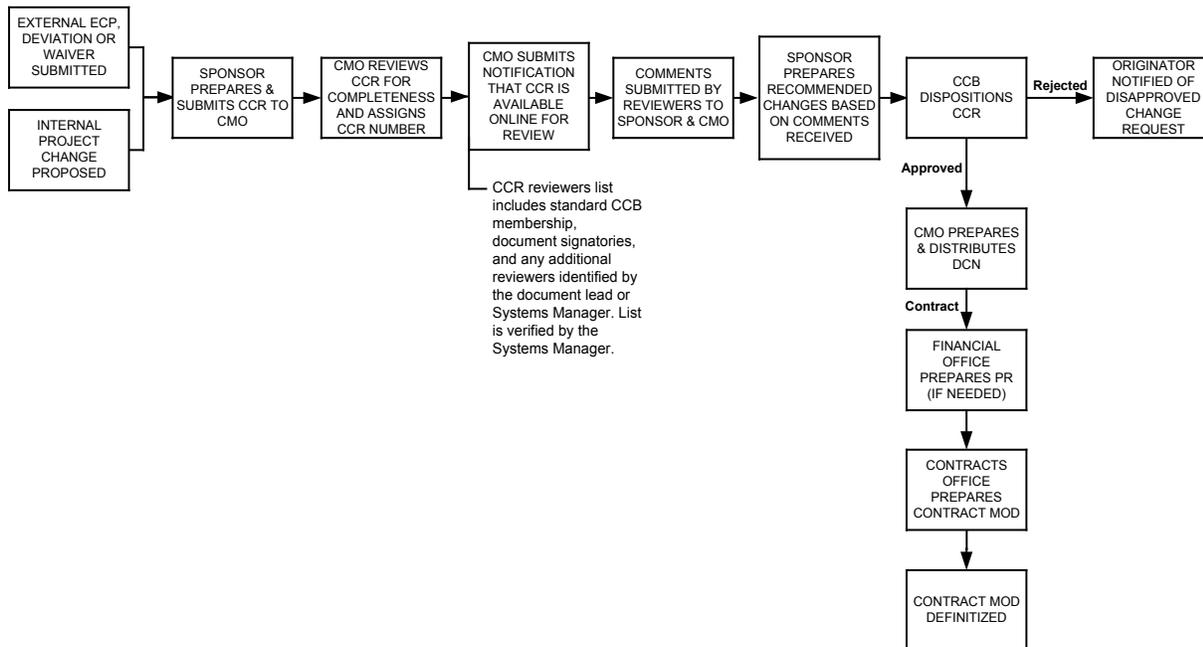


Figure 1.0 CCR Process

CMO will assign the CCR number, enter the CCR into the system and begin processing the CCR for review. The CCR numbering scheme will be 433-XXXX (project code and sequential number). The CMO will begin to compile the related information that pertains to the entire CCR package as defined below. The online CCR database will maintain up-to-date information about the CCR as it progresses throughout the CCR lifecycle. Completed CCRs are CM Quality Records and will be controlled per the Control of Quality GPG 1440.7.

7.3.3.1 Preparation of CCR Package

CHECK THE GLAST PROJECT WEBSITE AT <http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

The CMO is responsible for compiling a complete master CCR package to be stored on file in the CM Office. This package contains a hard copy of all related information that may pertain to the CCR and is kept on file in the CM Office for historical purposes. The CCR package contains all related information that pertains to a CCR and will include the following items:

- CCR Form (original signature on file)
- Proposed change pages to baseline document or complete document for original baselines to affected documents
- Contractor Rough Order of Magnitudes (ROMs)
- In-house cost estimate
- Comments/Sponsor Recommendation
- E-mail correspondences
- Related DCNs
- CCB Agendas
- CCB Minutes

7.3.3.2 CCR Review

The CCR review process will be implemented online using the GLAST CM system. The CMO creates a list of personnel to review each CCR. CCR reviewers list includes the standard GLAST Project CCB membership, the document signatories, and any additional reviewers identified by the document lead or Systems Manager. Once this list is established, the CMO will have the GLAST Systems Manager verify that all pertinent personnel have been included in the CCR review list. The reviewers will then be notified to review the proposed CCR online. Reviewer comments will be submitted online to the CMO and the CCR Sponsor in parallel by a specified due date. The sponsor will then create the Sponsor Recommendation based on the comments received.

7.3.3.3 Sponsor Recommendation

Once all comments have been received for a CCR, the sponsor will prepare the Sponsor Recommendation. The Sponsor Recommendation contains all CCR comments submitted by reviewers and the sponsor's response for each of the comments. The Sponsor Recommendation will become part of the CCR package for CCB review.

7.4 DEVIATIONS AND WAIVERS

Deviations and waivers are requests to deviate from authenticated baseline requirements either before or after their manufacture or development.

7.4.1 Definition of Deviations and Waivers

A deviation is a specific written authorization, granted prior to the manufacture or testing of an item, to depart from a particular performance or design requirement of a specification, drawing, or document.

A waiver is a specific written authorization, granted after the manufacture or testing of an item, to depart from a particular performance or design requirement of a specification, drawing, or other document, but is considered suitable for use “as is”.

7.4.2 Classification of Deviations and Waivers

A deviation/waiver is classified as minor if it consists of a departure that does not involve safety; performance; interchangeability; reliability, or maintainability of the item or its repair parts; effective use or operation; weight; or appearance.

A major deviation/waiver is one that consists of a departure involving any one or all of the factors listed above, with the exception of safety.

A deviation/waiver is classified as critical if it consists of a departure from a characteristic in the documentation that involves safety.

7.4.3 Processing of Deviations and Waivers

All requests for deviations or waivers shall be documented on a project approved form of the developer's choice. All requests shall be submitted through the associated CO or the PDL as appropriate, with copies to the GLAST CMO. The requests will be logged in, a CCR form will be completed by the CCR sponsor, and a CCR number will be assigned by the CMO. The resulting CCR will then be processed through the normal CCR flow for dispositioning by the CCB.

7.4.4 Approval of Deviations and Waivers

Minor deviations and waivers shall be dispositioned by the PDL authorized to concur in classification of Class II changes. Major and critical deviations and waivers shall be dispositioned only by the CCB. All dispositioned changes shall be documented in either a contract modification form or an approval letter.

When implementation and notice of completion information is sent to the Project CMO, the CMO closes out the CCR tracking data and archives the information.

7.5 CONFIGURATION CONTROL BOARD

The CCB is a group of technical and administrative personnel responsible for establishing the baselines against which changes, deviations or waivers may be proposed, evaluated and approved or disapproved.

The CCB review process is used to control new document releases and changes to ensure they are compatible in terms of technical performance, schedules and cost management implications. Each CCB is responsible for controlling baselines and changes to those baselines at their level. Changes that affect higher-level requirements will be submitted to the CMO responsible for coordinating the operations of the CCB affected.

The GLAST CCB meets at the direction of the CCB chairperson to evaluate all CCRs submitted to the CCB by project team members. CCR originators/sponsors present and defend recommendations to the CCB. The CCB thoroughly reviews and gives proper consideration to the change's impacts on defined CIs from all aspects, e.g. technical, interfaces, operations,

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

logistics, schedule, cost, etc. The CM Office maintains all comment records. The CCB Chairperson makes the final decision on all CCB recommendations.

The CCB Chairperson is responsible for obtaining appropriate approval/disapproval for any proposed changes that are beyond the authority of the GLAST Project. Figure 2.0 identifies the CCB Levels.

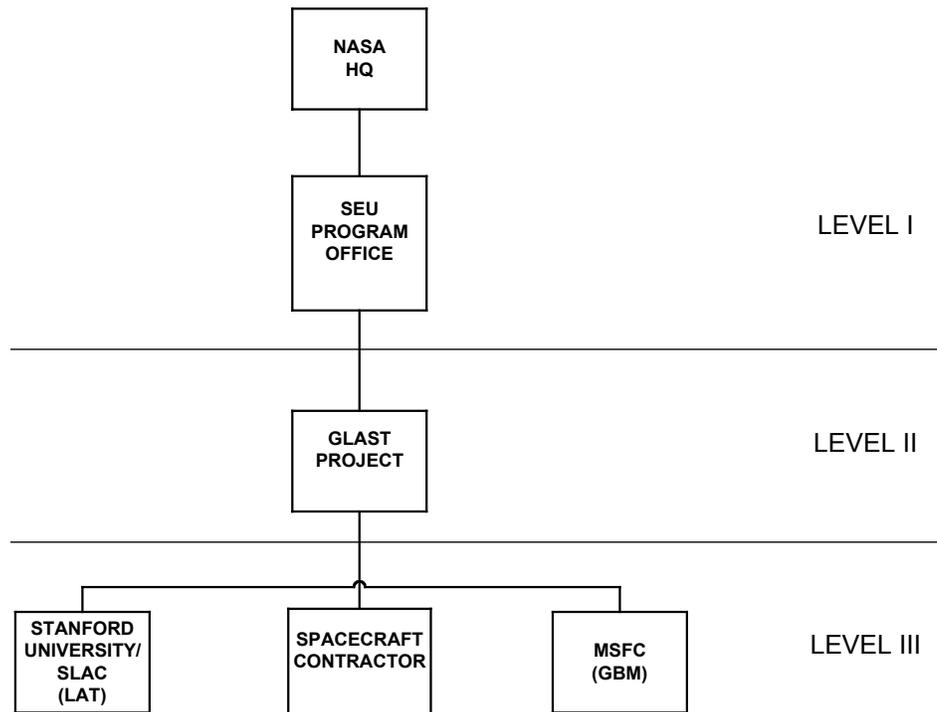


Figure 2.0 GLAST Project CCB Levels

7.5.1 CCB Member Responsibilities

The following disciplines have major responsibilities for the GLAST CCB:

- Project Manager —The Project Manager is responsible for all technical and engineering considerations regarding proposed changes to the CIs. He/she represents the project at program CCBs as needed, and performs the following:
 - Ensures that all participating GLAST functional organizations and contractors comply with GSFC CM requirements (GPG 1410.2 and 400-PG-1410.2.1).
 - Appoints permanent and Ad-Hoc members to the CCB.
 - Calls scheduled and unscheduled meetings of the CCB.
 - Evaluates the recommendations of the CCB, approving or disapproving all CCB recommendations within the scope of the Chairperson's authority and authorizing the establishment of baselines.

- Obtains proper authorization for technical, engineering or resource changes that are beyond his/her personal authority.
- Deputy Project Manager —The DPM will review all CCRs to evaluate overall technical impact to the GLAST Project. The DPM may be designated to serve as CCB chairperson.
- Deputy Project Manager for Resources —The DPMR will review all CCRs to evaluate impacts to GLAST Project cost, resources, procurement, and schedules.
- Project Scientist — The Project Scientist will review all CCRs to evaluate impacts to the scientific aspects of the GLAST mission.
- Systems Manager—The Systems Manager will review all CCRs to evaluate impacts on overall GLAST flight and ground systems.
- Observatory Manager—The Observatory Manager will review all CCRs to evaluate impacts to the Spacecraft and the Instrument interfaces.
- Instrument Manager—The Instrument Manager will review all CCRs to evaluate impacts to Instruments and the Spacecraft interfaces.
- Systems Assurance Manager (SAM) —The SAM will review all CCRs to evaluate impacts relating to Systems Assurance. The SAM will also ensure change implementation by hardware/software verification and ensure compliance with GSFC Quality/Safety Assurance requirements.
- Ground Systems/Operations Manager—The Ground Systems/Operations Manager will review all CCRs to evaluate impacts to ground system elements and operations systems development.
- Contracting Officer —The CO will review all CCRs to evaluate impact to contracts and cost. He/she is also responsible for ensuring incorporation of changes into the contract, if applicable, once the changes have been approved.
- Financial Manager—The Financial Manager will review all CCRs for impact to GLAST Project budget and cost.
- CM Officer —The CMO is responsible for ensuring effective, controlled flow of data through the CCB. The CMOs duties include acting as central point of contact for configuration changes, reviewing CCRs, scheduling CCB meetings, acting as CCB secretary and publishing minutes, tracking CCB actions, and preparing and maintaining CM status accounting reports.
- Ad-Hoc Members—Ad-Hoc CCB members may consist of disciplines associated with Ground Systems, Project Operations, Systems, Instruments, Spacecraft, Science, and Scheduling. They will be selected based on relevance of their expertise on an as-required basis.

7.5.2 CCB Agendas

The GLAST CMO will generate formal agendas. The agenda will be published one week prior to the scheduled meeting. The CMO will send e-mail agenda notification to the CCB participants. Original agendas will remain on file in the CM Office and a copy will be kept with the original CCR folder.

7.5.3 CCB Meetings

Members will be notified by the CMO regarding time, location and agenda of each meeting. The CMO will facilitate each meeting.

7.5.4 CCB Disposition

Proposed changes are reviewed at the GLAST CCB meeting with input from all CCB members and Ad-Hoc invitees. The final decision to approve or disapprove is the responsibility of the GLAST CCB Chairman. The GLAST CMO will record and distribute the technical minutes and action items of each GLAST meeting. CCRs are dispositioned using one of the following categories: Approve, Reject, or Withdraw. Rejected/Withdrawn CCRs are kept on file in the CMO with no action. Deferred CCR packages are maintained by the CMO awaiting completion of actions resulting from the CCB meeting.

7.5.5 Configuration Control Board Directive (CCBD)

Evaluation and authority for implementation of Class I and II changes will be by direction of the Project Manager or his/her designee. No other individual or participants may direct the implementation of approved changes.

A CCBD may exist in two forms: Letter of Direction, or CCB Meeting Minutes. The CCB Chairperson may use CCBDs to direct a person(s) or organization to complete actions assigned by the CCB. Where appropriate, CCBDs may include a schedule for verification of change implementation.

7.5.6 CCB Minutes

The GLAST CMO will generate technical minutes of CCB meetings. The minutes will list meeting attendees, CCR(s) discussed, disposition of the CCR(s) discussed and CCR action items. The CCB Chairman signs the meeting minutes. The CMO will post the minutes on the GLAST web site. Original minutes will be filed in the CM Office and a copy will be kept in the CCR folder.

7.6 DOCUMENT CHANGE NOTICE (DCN)

Once the CCR has been approved by the appropriate chair, the CMO will issue a formal DCN which will be signed by the sponsor of the change. The DCN provides notification that a GLAST Project controlled document has been changed and the updated version is available on the GLAST MCDL. The DCN identifies the change number, release date and pages changed. It also references the CCR number that was approved to authorize the change. The original DCN package document change history will remain on file in the CMO.

Change notice numbers and change bars identify changes to baseline documents. Change notice numbers and change bars are located in the right hand margins and will appear adjacent to the line or paragraphs where nomenclature has been added, changed or deleted from a

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

baseline document. Change bars, will only be placed on change pages and not in newly issued revisions.

7.6.1 Change Notice Number

Change numbers are assigned in consecutive order (i.e., CH-01, CH-02, CH-03).

7.7 **CONTRACTUAL IMPLEMENTATION OF APPROVED CCRs**

The GLAST CMO will submit CCR packages to the CO for contract modification preparation. A procurement request shall be generated (as needed) for each approved change that affects a contract. The CO will proceed under the appropriate procurement procedure to achieve contractual implementation. Receipt of the formal CO direction shall constitute the sole authority for the contractor to implement the change.

8.0 **CONFIGURATION STATUS ACCOUNTING (CSA)**

CSA is the recording and reporting of all GLAST Project approved documentation that identifies established baselines and the proposed and approved changes to these baselines. The CMO will record, maintain, and report the information needed for managing the configuration effectively, including a list of the approved configuration identification, the status of proposed changes to the configuration, and the implementation of the approved changes. The CSA system generates reports that provide the various GLAST Project management levels with essential data on configuration identification and control. Comparison of these data with the fabricated and tested CIs will enable the GLAST Project to verify that each CI meets all program and contractual requirements.

These reports will include a list of proposed configuration changes, the status of the proposed changes and any associated action items. A documentation change log will be maintained for each controlled document identifying the current change status and the document change history. This data shall be used by the Project CMOs to track the receipt, approval status, implementation of approved changes, and document change status.

9.0 **CONFIGURATION VERIFICATION**

9.1 **CONFIGURATION MANAGEMENT AUDIT**

The GLAST Project CMO is responsible for ensuring that the configuration management discipline in this procedure is implemented throughout the GLAST Project in accordance with the standards and policies established by this procedure.

9.2 **AUDIT TEAM**

Audits shall be scheduled and audit teams appointed by the Project Manager. The required membership of the audit team depends on the complexity of the equipment, the volume and type of documentation associated with the hardware or software, and the depth and detail of the documents to be audited.

9.3 **CMO RESPONSIBILITY**

CHECK THE GLAST PROJECT WEBSITE AT
<http://glast.gsfc.nasa.gov/project/cm/mcdl> TO VERIFY THAT THIS IS THE CORRECT VERSION PRIOR TO USE.

The CMO shall conduct periodic configuration audits at the Project and developer levels, per direction from the GLAST Project Manager. This audit process ensures that CM procedures are being adhered to and properly implemented and that CCBs are not being bypassed.

The GLAST Project will conduct a CM system audit at the provider's facility soon after the contract or agreement has been signed to ensure that the provider has a CM system in place that is in compliance with their CM procedures. The Project may conduct additional audits as the Project matures to determine that the provider system is functional and the "as-built" products are consistent with the "as-designed" documentation, and that the documentation and products incorporate any approved changes.

10.0 DEVELOPER CONFIGURATION MANAGEMENT

Developers are responsible for all changes including, but not limited to, those affecting the internal interfaces, cost, schedule, and performance of their respective activities.

Each developer shall assign responsibilities within their organization for the implementation of a formal CM system that satisfies the configuration control requirements of the contract.

Developer CM plans and systems shall apply to the associated subcontractors and shall be subject to approval by the respective prime developer/contractor. Each developer shall identify a Configuration Management Officer (CMO) within its organization. The CMO shall be responsible for maintaining the developer's CM requirements and shall ensure the developer's compliance in implementation of configuration identification, configuration change control, and configuration status accounting systems and procedures. Each developer should have the CCB structured to provide an effective management tool for evaluating, approving, and maintaining configuration control of hardware and software changes. These boards should provide a disciplined means for the review and evaluation of all proposed changes that affect engineering drawings, specifications, procedures, software development or other project baselines.

Developer's CM procedures will be subject to the GLAST Project concurrence.

11.0 REQUIREMENTS TRACEABILITY

A requirements traceability database is currently used as a tool for managing GLAST Project requirements. The GLAST Configuration Management Office maintains the master signed versions of the GLAST Project controlled documents which are listed and located (in PDF format) on the MCDL.

Once a GLAST Project document is baselined, the CMO will ensure that the database contains the exact information contained in the MCDL version. The database will be used exclusively as a tool for establishing and tracking requirements. The CMO will use the database to ensure that all affected documents are identified when proposed changes are submitted for CCB review. The CMO will also work with the requirements traceability database system administrator to ensure that GLAST Project CCB approved document changes are correctly incorporated into the database.

