Procedures and Guidelines (PG)

DIRECTIVE NO. 820-PG-1410.2.1A	**APPROVED BY Signature:** *Original Signed by*
EFFECTIVE DATE: July 15, 2010	**NAME:** David L. Pierce
EXPIRATION DATE: July 15, 2015	**TITLE:** Chief, Balloon Program Office

COMPLIANCE IS MANDATORY

Responsible Office: Code 820/ Balloon Program Office (BPO)

Title: BPO Configuration Management (CM) Procedure

PREFACE

P.1 PURPOSE

This CM Procedure describes identification and processing of configuration controlled items for the Range and Mission Management (BPO). It also describes the documentation control nomenclature scheme for the BPO documents and the description of the CM interface between the BPO and the individual projects, and those CM requirements for the projects.

P.2 APPLICABILITY

This CM Procedure is applicable to the BPO and to each flight or system project within the program.

P.3 AUTHORITY

GPR 1410.2, Configuration Management
800-PG-1410.2.1, Documentation Configuration Management

P.4 REFERENCES

GPR 1410.2, Configuration Management
GPR 1440.8, Records Management
GSFC Form 4-35, GSFC Configuration Change/Approval Request

P.5 CANCELLATION

820-PG-1410.2.1, BPO Configuration Management (CM) Procedure

P.6 SAFETY

None

P.7   TRAINING

None

P.8   RECORDS

Record Title	Record Custodian	Retention
Controlled Document List	820 Configuration Management Specialist (CMS)	*NRRS 8/103. Temporary. Destroy/delete between 5 and 30 years after program/project termination.
Configuration Change / Approval Requests List	820 Configuration Management Specialist (CMS)	*NRRS 8/103

NRRS – NASA Records Retention Schedule (NPR 1441.1)

P.9   MEASUREMENT/VERIFICATION

The Program CM Office shall establish metrics aimed at improving CM within the program. Similarly, any BPO projects who choose to not use this document shall establish their metrics and reporting processes as part of project CM procedures. Any CM metrics and reporting processes the projects establish shall be reviewed and signed by the Program's Configuration Management Officer (CMO) for completeness. The Controlled Documents List (CDL) and Program Configuration Change/Approval Requests List shall be maintained and posted to the Program Office website or BPO library.

PROCEDURES

In this document, a requirement is identified by "shall," a good practice by "should," permission by "may" or "can," expectation by "will," and descriptive material by "is."

1.   Introduction
This document describes the processes to be followed by the BPO and its projects regarding configuration management (CM) functions and the CM interfaces between the Program Office and the projects. The Program Office has only a limited number of documents requiring CM. Control of Program Office CM documents will be accomplished using the processes described herein. The Program's Controlled Documents List shall be the list of Code 820 controlled documents. The Program Office Controlled Documents List will be displayed by the GSFC Centralized Configuration Management System (CCMS) (http://gdms.gsfc.nasa.gov/gdms/pls/appmenu)or in the BPO library maintained by the CMS.

All program and project personnel shall comply with the requirements of this directive to the extent applicable. However Projects may amend these procedures by obtaining a waiver from the Chief, BPO.

The procedure changes shall be documented in the project CM plan that shall be approved by the Program's CMO. They shall ensure usage of the current versions of procedures and other documents in all cases. They shall maintain a Controlled Documents List to verify proper versions, and they shall use the Goddard Directives Management System for directives.

1.1 Configuration Identification and Accessibility

Program level control document numbers shall be assigned by the Program Office Configuration Management Officer (CMO). Projects shall define their control document numbers assignment in their CM plan. The CMO shall also be responsible for controlling the Program's documents and the Controlled Documents Lists, ensuring relevant documents are available through an accessible website or library and that obsolete documents are annotated, removed or made unavailable for use.

2. Document Control Numbers

2.1 Program Office

All Program Office controlled documents shall be assigned unique document identifying numbers. The first three-four characters of the document number shall be the Program Office organizational code (e.g. 820). The next set of characters shall describe the document type (e.g., PLAN, RQMT, ICD, RPT etc.). See Attachment 1 for a list of recommended document types (the list is not all inclusive). The next set of numbers will represent the year the document was generated followed by a sequential number obtained by the CMS. An example of a unique document identifying number is: 820-PLAN-1998-1.

2.1.1 Revision

Informal revisions to a document can be made any time prior to completion of the approval process. However, when the document has been approved and released, any changes or revisions require the approval and re-release of the document. The revision review and approval process is the same as for the original release. Any revision to a document shall be issued in its entirety with the revision letter changed to the next letter in the alphabet.

Proposed revisions can be submitted by a redlined copy of the document, or change history log, or edit changes in Word. Redlining should be done using a red colored pencil, pen, or felt tip marker. A single line through the text indicates deletions. If a block of text is to be inserted, it may be written on a separate sheet and the original document redlined to indicate where the text block is to be inserted. A record of revisions shall be maintained in the document. The format of the revision notice shall include the following information:
- Identification of each revision level.
- Summary of revision. Unless the document is very substantially revised, each change should be identified by paragraph number and briefly described. Minor corrections to spelling and syntax need not be identified.

(The Change History Log in this document is an example of a free-form format that is easily maintained.) A new signature page shall be signed for each new revision of the document. When all approvers have signed or initialed their approval, the revised document is released.

2.2   Projects

It is recommended that all projects shall use the numbering system described above.

3.   Identification of Controlled Documents

3.1   Program Office

All controlled documents shall have a cover page which contains the BPO Control Number, document title (include Project/Program name in title), revision indicator, effective date, and an indicator that BPO is the responsible organization. This information shall be included in a Controlled Documents List. It shall also incorporate a footer that states the document is a BPO controlled document and provides a URL to the official document version as the examples below illustrate:

This is a BPO Controlled Document. Either check the BPO library at http://internal.wff.nasa.gov/BPOlib/login.php or check with the Configuration Management Specialist to verify that this is the correct version.

All controlled documents shall have a revision/change log. The log shall contain revision, change descriptions, change dates, and authorizing CCR numbers, as a minimum.

3.2   Projects

Projects shall have similar identifying information on their cover pages, with a footer indicating where a user can verify the proper version. They also shall have a revision/change log.

4.   Selection of Controlled Items

4.1   Program Office

The Program Office does not produce any hardware or software items that require configuration control. However, they produce a limited number of documents under configuration control for example: Program Plan, Risk Management Plan, and Configuration Management Plan. Identification of program documents to be placed under configuration control shall be the responsibility of the Chief or Deputy Chief, BPO and is done on a case-by-case basis.

All changes that affect the Program Plan or Project Plans are subject to review and approval by the Program.

4.2   Projects

The individual projects shall describe the project Configuration Items (CI) in their CM plan. That is which documents will be controlled, or specify the criteria by which documents are selected for configuration control. The project shall identify hardware and software items to be placed under configuration control, and identify the responsibilities and procedures required for control.

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5. Controlled Documents List (CDL).

5.1 Program Office CDL

The CMO shall maintain the Program Office's CDL. It will include, for each controlled document, the BPO Control Number, document title, revision indicator, and effective date. The CMO shall be responsible for proper posting of all documents and changes on the CCMS, Program Office Web Site or BPO library.

5.2 Project CDL

The project shall maintain the Project CDL. All projects shall establish their own CDL, which shall be kept up to date continuously. They may use the CCMS, or they may choose other databases. Current project CDLs shall be available on-line to users.

5.3 Project Configured Articles List (CAL)

All projects shall establish their own CAL, which shall be kept up to date continuously. They may use the CCMS, or they may choose other databases. Current project CALs shall be available on-line to users.

6. Configuration Control Board (CCB) Structure

6.1 Program CCB

The Code 820 Program CCB shall be chaired by the Chief, BPO or his/her designee, and normally consists of the Program Business Manager, the Deputy Chief, BPO, the CMO, and ad hoc attendees as required. The CCB Chair determines the CCB members for each CCR.

6.1.1 Chairperson

The Chairperson of the CCB shall be responsible for:
a. Authorizing the scheduling of routine, urgent, and emergency CCB meetings, and Out of Board processing of CCRs;
b. Presiding over all Program-level CCB meetings;
c. Appointing additional members to the CCB, as the program warrants, for both the standing and the ad hoc membership;
d. Resolving any class designation effectively, or approval requirement disputes, or any other related disputes that require intervention and resolution by the CCB Chairperson;
e. Ensuring that potential financial, manpower, and schedule impacts of all proposed changes have been considered;
f. Obtaining proper authorization for technical, engineering, or resources changes which are beyond his/her personal authority; and
g. Authorizing the establishment of baselines and making the final approval/disapproval decisions on change proposal recommendations.

6.1.2 Program CMO

The Program CMO is a non-voting member of the CCB and shall be responsible for the administrative aspects of the CCB/CCR process, including the following:

a. Assisting individuals in the completion of forms used for change requests;
b. Verifying that each change request package is as complete as possible, with redlined change pages and/or the "change from" and "change to" pages attached to the proposed CCR;
c. Forwarding change requests to appropriate individual(s) for review and recommendation, and approval for processing;
d. Assigning a CCR tracking number and logging pertinent data into the CM database for tracking purposes;
e. Distributing the change requests to identified CCB members and other required reviewers;
f. Notifying CCB members of the scheduled meeting date, time, location and agenda and performing as recording secretary for the CCB;
g. Obtaining CCB Chairperson signature for approval or disapproval;
h. Tracking and reporting CCR status through completion;
i. Notifying team members that CCR information is available for reference. If requested, distribution of such information will be made to all CCB members and affected personnel. Disapproved CCRs will be returned to the originator with direction for further action, if required;
j. Tracking action items and ensuring that all affected documents are changed in accordance with CCB direction;
k. Notifying program personnel, as appropriate, that documentation has been revised and is available on CCMS, Program Web Site or BPO library. Updated documentation will be distributed upon request.

6.1.3 Ad hoc Members

Ad hoc members shall be responsible for the following:

a. Reviewing and commenting on proposed changes based on their particular expertise;
b. Supporting CCB meetings when requested; and
c. Recommending approval/disapproval of proposed changes.

6.2 Project CCB

In their project CM plan, projects shall define who chairs the CCB, who the standing and ad hoc members are, and their responsibilities. Responsibilities should be similar to those identified for program CCB members.

7. Configuration Control Process – Program Office
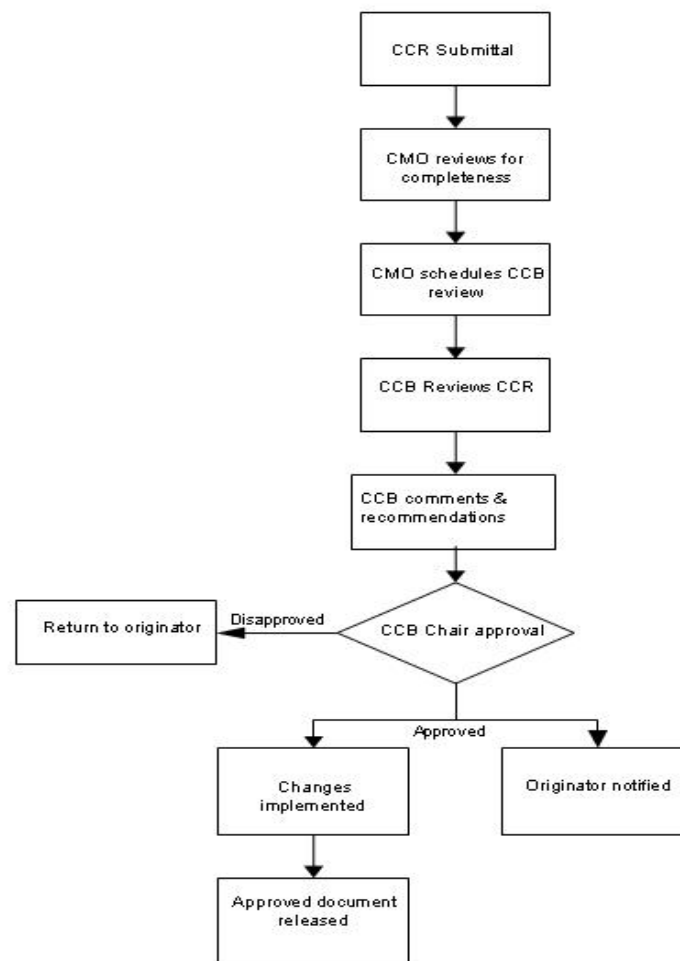
7.1 Process Summary

Figure 1 shows the general processing flow for program CCRs. Projects should consider using this processing flow for the project's CCRs. Figure 2 shows the processing flow for Level 1 changes, i.e., those that require Suborbital and Special Orbital Projects Directorate approval. This diagram shows the flow from the lowest level, project through to final implementation. It shall be noted that the Program CCB shall evaluate all changes that affect the requirements specified in the Program Plan or any requirements defined in the individual Project Plans.

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Figure 1. Configuration Change Review Process

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Figure 2 Level 1 Processing Flow

Figure 2: Level I Processing Flow

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7.2   Program Level CCR Processing

7.2.1   Submittal of the CCR to the Program CMO

The CCR package shall consist of the CCR, proposed document or change pages, and backup information (if needed).

The CCR shall be GSFC Form 4-35, available from the Goddard Directives Management System (GDMS) Forms Master List. At a minimum, the CCR shall contain the following information:
a.   Initiators name, organization code, and e-mail address.
b.   Date submitted.
c.   Title and number of CCR
d.   Affected Configuration Item (e.g., specific documents and/or hardware/software affected) identified by document title and number.
e.   Revision/change (letter and/or number of document to be changed).
f.   Complete technical description of proposed change(s), including specific referenced document(s) and document rewording necessary to effect the change.
g.   Complete rationale for proposed change(s).
h.   Change priority: routine, urgent, or emergency.
i.   Cost and schedule impact.

The originator forwards the electronic file of the CCR package to the Program CMO.

7.2.2   Preparation of CCR Package
The CMO is responsible for processing the proposed change throughout the CCR lifecycle.   The CMO shall ensure that all affected requirements are identified and shall assess the CCR for completeness and accuracy. The CMO shall assign the CCR Control Number and compile the related information that pertains to the entire CCR package as defined below. CCRs shall be numbered using the 820 organization code followed by a dash, document type or code, CCR and then concluding with a sequential three-digit number. The sequential three-digit number shall be unique for each project. For example: 820-PLAN-CCR-001.

Completed CCRs are records and shall be controlled per GPR 1440.8.

7.2.3   Scheduling of the Program CCB
Prior to a CCB meeting, the CMO will issue a meeting schedule and agenda that lists CCRs to be discussed at the meeting. This will be done sufficiently in advance of the meeting to allow members adequate time to review the CCRs. Scheduling shall be based on CCR priorities.

The CMO will issue special notices for urgent and emergency CCRs. The CMO will work directly with the CCB chairperson to deal with emergency CCRs that must be acted upon immediately. CCRs will be prioritized as follows:

Routine- The CCB convenes and processes the CCR within 3-4 weeks of receipt by the CMO.
Urgent- The CCB convenes and processes the CCR within 1 week of receipt by the CMO.

<u>Emergency-</u> The Chairperson calls a special CCB meeting or consults with the board members and processes the CCR within 24 hours of receipt by the CMO.

7.2.4   CCR Review

The CCR review process may be accomplished using hard copies or e-mail. The CMO, working with the CCB Chair, shall identify a list of personnel to review each CCR. The CMO then notifies reviewers to review the proposed CCR and submit comments by a specified due date. The process flow is shown in Figure 1.   Program level CCRs that require Suborbital and Special Orbital Projects Directorate approval shall follow the additional steps shown in Figure 2.

7.2.5   CCR Disposition

Once the CCB has approved the CCR, the CMO shall obtain approval signatures on a hardcopy CCR form. Then the CMO notifies all relevant personnel and formally releases the updated controlled document on the Program Web Site or BPO library.

If the CCR is disapproved, a copy shall be returned to the originator with an explanation.

The CMO shall ensure that a complete master CCR package is filed in the Program CM Office. This package contains a hard copy of all related information that pertains to the CCR and is kept on file in the CM Office to meet NASA and GSFC record-keeping requirements.

7.2.6   Verification of Change Implementation

Verification is necessary to ensure proper implementation of CCB directives. This verification shall occur after the responsible implementer has completed the change and notified the CMO. After the CMO receives confirmation that changes have been implemented, the CMO closes the CCR.

8.   Project Configuration Control

Projects shall use the configuration management procedures established herein and are encouraged to use the Program Office CM Plan. However, projects may modify the configuration management process appropriate to the project's mission. If Projects elect to have their own CCB, they shall establish a CCR/CCB review process that follows the flow described in Figure 1. Any deviations to the configuration control process or procedures shall be documented in the project CM Plan and be approved by the Program CCB. These processes shall comply with GPR 1410.2.

Projects are encouraged to use the standard GSFC Form 4-35 as the CCR form. However, projects may use their own CCR form, or use or modify the standard GSFC Form 4-35 as described in GPR 1410.2. For proposed changes to Program Office-controlled documents, projects shall submit a GSFC Form 4-35 to the Program CMO.

Projects shall maintain a database for a repository of controlled documents. This database shall be accessible, at a minimum by the BPO Chief, Assistant Chief and CMO.

Project Managers have approval authority for all changes that do not affect the Project Plan and Level 1 requirements.

8.1   Project-Initiated Changes Not Requiring Program Approval

Project managers shall exercise their own ideas in establishing these procedures, and may deviate from the requirements herein if waived by the Chief, BPO. Approval of a project's CM plan with documented process or procedure changes by the Chief, BPO constitutes a waiver from these requirements.

8.2   Project-Initiated Changes Requiring Program Approval

Mission level schedule milestones, Level 1, and changes that affect the Project Plan are examples of project-initiated changes requiring program level approval. Project-initiated changes that require Program approval shall be submitted to the Program Office CCB for processing. A change to a project plan is, by definition, a change to the Program Plan. For Projects initiating changes requiring Program approval, the project shall follow the steps in section 7.2.

For these types of changes, projects shall process the change at the project level, and then submit a GSFC Form 4-35 CCR for Program-level processing. The Program Office then prepares the CCR for Suborbital and Special Orbital Projects Directorate (Code 800). Following Code 800 approval, the Program Office dispositions all decisions.

This process is illustrated in Figure 2.

9.   Configuration Audit/Review

The Program Office, through the CMO, may perform CM audits on any of the Projects. Projects will perform CM audits of their contractors as deemed necessary.

10.   Waivers to These Requirements

Projects may impose requirements that differ from those herein, if the Chief, BPO issues a waiver statement. If the project's configuration management procedures differ from the requirements herein, the changes will be documented in the project CM plan and submitted to the program CCB for processing. Approval by the program CCB will constitute the required waiver.

11.   Conclusion of Projects

At the conclusion of the BPO project/mission, it will be the responsibility of the project manager to provide the Program's CMO with all original documents, flight data, photos or other project/mission relevant information. Two copies of the information shall be made, one primary and one backup copy on optical media, i.e. CD or DVD. The CMO shall assign these optical media devices to the CMS for storage in a locked cabinet. In addition, the project manager shall provide the CMS all relevant project information in a scanned, PDF, and for photos (compressed) format on an optical media. It shall be the responsibility of the CMS to enter this information in the BPO library.

Appendix A – Definitions

Refer to GPR 1410.2 for additional definitions

A.1 Centralized Configuration Management System (CCMS) – an online documentation library of configuration controlled and uncontrolled program / project documents established and maintained by GSFC. (http://gdms.gsfc.nasa.gov/gdms/pls/appmenu)

A.2 Configuration Document – documents that define requirements, design, build/production, validation, and interfaces of a product or service. *Configuration Documents are Configuration Items within this Procedure.*

A.3 Configuration Item – designation applied to the product that has been determined to be subject to CM requirements. Products include hardware, software, processed materials, services, or any discrete portions thereof treated as a single entity in the configuration management process. *Configuration Documents are also Configuration Items within this Procedure.*

A.4 Configuration Management Officer (CMO) – an individual whose responsibilities shall include the following:
♦ Assigning control document numbers to the Program level documents
♦ Controlling the Program's documents and the Controlled Documents Lists
♦ Ensuring relevant documents are available through an accessible website or library and that obsolete documents are annotated, removed or made unavailable for use
♦ Reviewing and signing any project level CM metrics and reporting processes for completeness
♦ Supporting Program-level CCBs

A.5 Configuration Management Specialist (CMS) – an individual whose responsibilities shall include maintaining the BPO library and storage of the original documentation from both the project(s) and Program.

A.6 Controlled Document – a document that requires change control action by the responsible organization (*Program Office or Project)* before the document can be issued or altered in any way. *Controlled documents are subject to the requirements of GPR 1410.2 and of this PG.*

A.7 Controlled Documents List (CDL) – an organization's list of their controlled documents, as described in the organization's configuration control procedures. *Within this PG, the CDL is a subset of the Master Documents List (MDL). There may be a MDL for the each project.*

A.8 Configured Articles List (CAL) - describes all configured item hardware, software, GSE, and supporting documentation. The exact configuration definition of the hardware and software can be determined from these listings.

A.9   Master Documents List (MDL) – an organization's list of all documents written, and cataloged by the organization. The CDL and CAL are subsets of the MDL.

Appendix B – Acronyms

BPO	Balloon Program Office
CAL	Configured Articles List
CCB	Configuration Control Board
CCMS	Centralized Configuration Management System
CCR	Configuration Change/Approval Request
CDL	Controlled Documents List
CI	Configuration Items
CM	Configuration Management
CMO	Configuration Management Officer
CMS	Configuration Management Specialist
GDMS	Goddard Directives Management System
MDL	Master Documents List

Attachment 1
Document Type Categories
(This may not be an inclusive list)

ANYS	Analysis Type Document
BWGS	Balloon Working Group Presentations
CMPN	Campaigns
CNFS	Conference Presentations
CORR	Correspondence
FORM	Controlled Forms
ITP	All Test Procedures
LIST	Lists, all lists maintained on a regular basis
LOGS	Record Logs
MANL	Manuals
MEMR	Memorandums
MSR	Monthly Status Reviews Presentation
OPS	Operations Document
OUTR	Outreach and Student Reports
PHTO	Photos
PPNS	All Project Plans
PRGM	Program Documents
PROC	Procedural Documents
PROJ	Project Documents not specifically covered elsewhere
REQ	Requirement Documents
RPT	Most reports
RSTR	Restricted documents such as budgetary, proposals, Directors Discretionary Funds, contract information. These documents will only be available to selected individuals
RVWS	Reviews
SFTY	All safety related documents, Ground, Institutional, Flight, Project
TECH	Technical Papers

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CHANGE HISTORY LOG

Revision	Effective Date	Description of Changes
Baseline	July 15, 2005	Initial Release
A	July 15, 2010	**Overall updating of CM process including updating PG template**