STEREO
IMPACT

Configuration Management Plan

IMPACTCMPlan_B.doc
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A		Preliminary Draft	-
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1. Introduction

This document describes the Configuration Management plan and procedures to be used by the STEREO IMPACT development team. This plan works in conjunction with the STP Configuration Management Procedure (reference 1) that primarily deals with control at the STP program and STEREO Project levels.

1.1. *Scope*

This document is applicable to all flight hardware, flight software, and critical ground support equipment. The requirements of this documentation shall be implemented from Phase B through the launch of the IMPACT.

1.2. *Configuration Management Objective*

The objective of the IMPACT Configuration Management Program is to actively apply technical and administrative controls which:

- Identify and document the requirements, functions, and history of a configured item.
- Regulates changes to the configured item's characteristics.
- Record and report change processing and implementation status.
- Provide a means to introduce engineering efficiencies, cost savings, and product improvements to a configured item

1.3. *Document Conventions*

In this document, TBD (To Be Determined) means that no data currently exists. A value followed by TBR (To Be Resolved) means that this value is preliminary. In either case, the value is typically followed by code indicating who is responsible for providing the data, and a unique reference number.

1.4. *Applicable Documents*

The following documents include related documents and STEREO Project policies. In the event of a conflict between this document and the following documents, this document takes precedence. All documents can be found on the Berkeley STEREO/IMPACT FTP site:

http://sprg.ssl.berkeley.edu/impact/dwc/

1. 460-PG-1410.2.1B STP Program Configuration management Procedure
2. Plans/STEREO-IMPACT-PAIP_B (Performance Assurance Implementation Plan)

1.5. *Definitions*

The following definitions of terms are copied from Reference 1 for completeness.

- **Class I Changes** – A Class I change is a change where 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 Configuration Item (form,fit,

function); 3) contract end items/requirements (cost or schedule); 4) interfaces; 5) weight/power/datarate allocations; 6) technical risks; and 7) science performance). All proposed Class I changes aresubmitted 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) drawingchanges 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 Control** - Configuration control involves the systematic evaluation, coordination, and formal approval/disapproval of proposed changes and implementation of all approved changes to the design and production of a Configuration Item (CI) whose configuration has been formally approved by either the contractor or the National Aeronautics and Space Administration (NASA).
- **Configuration Item (CI)** – the term applied to the product and/or selected components that are designated by the Program/Project as subject to CM requirements and procedures. The “product" may be a system, subsystem, equipment, instrument package, data, software, or component, and includes its related documentation.
- **Configuration Status Accounting 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 configuration items, including such activities as maintaining the Controlled Documents List, status tracking of CCRs, status of CCB activities, and the subsequent reporting of such information to personnel and organizations associated with the Program/Project.
- **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. Requests for Deviations are classified as Class l and undergo the same approval routing as configuration changes.
- **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”. Requests for Waivers are classified as Class l changes and undergo the same approval routing as configuration changes.

2. Overview

The STP program Configuration Management (CM) Procedures called out in reference 1 shall control all Project level documentation, hardware, and software. This includes all IMPACT-generated deliverable documentation, hardware, and software from the time it is delivered to Project. This also includes all Level 1 CM Items as defined in Reference

1. All other IMPACT-generated items (including deliverables prior to delivery) shall be covered by this plan.

IMPACT CM shall be applied at three levels:

1. Interaction with Project CM
2. Suite CM
3. Instrument CM

Suite CM applies to top-level documentation and integrated hardware/software, while Instrument CM relates to sub-assembly level documentation and hardware as developed at each team member's institution.

3. Interaction with Project CM Plan

Any change request to a Project-controlled Level 1 or delivered item shall be made through the IMPACT Project Manager (IPM) at UCB via his Instrument Manager at GSFC. The Instrument Manager will be relied upon to determine what CM/CCB action is required at the Project level, and submitting/tracking the appropriate documentation (CCR, Waiver, or Deviation), with whatever input from the IMPACT team is required, as specified in the Project CM plan called out in reference 1. The Project CM Plan describes how these CI are controlled. The IPM shall be the point of contact between the Project CCB and the IMPACT Team through the CM process.

4. IMPACT Suite CM

Suite-level Configuration Management shall be the responsibility of the IMPACT Project Manager. This shall include all system-level documentation, interface control documents between the IMPACT subsystems and institutions, subsystem requirements, resource allocations, and science goals (as opposed to science requirements, which are controlled by the Project). In addition, the flight hardware, software, and critical GSE shall fall under the Suite CM system following IMPACT integration.

4.1. *Responsibilities*

The IPM will be the ultimate authority on change requests, deviations, or waivers to Suite CI, and will be responsible for gathering the required information to make these decisions and verifying that any changes decided upon are implemented. The IPM shall refer to the PI any science-related items. No fixed CCB shall be maintained, but appropriate input from relevant parties shall be obtained by the IPM prior to authorizing a change. The IPM shall also be responsible to notifying all affected parties of a change, in addition to maintaining records of the current configuration in an accessible on-line format.

Subsystem and Instrument Lead Engineers shall be responsible for identifying changes, deviations, or waivers to their CI that might effect suite of Project level controlled items and passing those change requests on to the IPM for disposition. This includes changes to subsystem cost, schedule, or other resources.

4.2. *Document Control*

Suite-level controlled documents shall reside on the IPM-controlled web site. Documents shall include a revision code appended to the file name and included on the cover page to identify the document revision. Documents shall include a change page to identify what changes have been made since the initial release, as well as change bars in the text. The IPM shall be responsible for notifying the appropriate team members of any change to a controlled document and getting approval when required via e-mail.

4.3. *Flight Hardware/Software Control*

Flight hardware shall be under the control of the subsystem engineer until it is integrated into the Suite. The subsystem engineer shall handle changes/deviations/waivers that do not affect Suite-controlled documents such as interface requirements, resources, performance requirements & goals, schedule milestones, etc. Otherwise changes shall be submitted to the IPM for disposition.

At the time of delivery of flight hardware to suite integration, documentation of the status of all waivers, deviations, problems shall be included. Completed as-built documentation such as schematics and drawings shall be maintained by the subsystem engineer, and shall be available upon request.

Following integration, all changes/deviations/waivers to the flight hardware or software shall be controlled at the Suite level by the IPM. Any change to a subsystem shall be referred back to the subsystem lead, who shall perform the change and update the as-built documentation accordingly.

4.4. *Problem Disposition*

Following first power application to a subsystem or instrument, and problems encountered shall be documented in a Problem Report and passed on to the IPM. The IPM shall be included in the decisions on how the problem is to be resolved, and shall sign-off on the close-out of the Problem Report. Project shall be informed promptly of any problem. The handling of problems is described in more detail in the IMPACT PAIP (reference 2).

5. Subsystem CM

Below the Suite level is the subsystem (Instrument / Subcontractor) level Configuration Management. This shall be carried out independently at each team institution using existing in-house procedures. Items covered at this level are things like schematics, parts drawings, subsystem fabrication records, subsystem test plans, procedures, and reports, and other subsystem documentation, as well as the subsystem hardware/software itself up to the time of integration. Typically these will be controlled by the lead engineer for the subsystem, who will be responsible for maintaining configuration control on the subsystem. Any change, deviation, or waiver at the subsystem level that effects an IMPACT Suite or Project level controlled item shall be passed on to the IPM for disposition.

5.1. *Document Control*

Subsystem-level documents, including schematics, drawings, low-level specifications, etc., shall be controlled by the subsystem lead. Document control shall be adequate to unambiguously determine the current and as-built design. Documentation shall come under formal control as the design matures, typically around the time of CDR, but no later than the start of fabrication of the flight hardware. At that time a configuration baseline shall be established which includes all the design, fabrication, and test documentation. Once under control, documentation shall include change history information to identify why the change was made, who authorized it, and when it was incorporated into the flight hardware.

5.2. *Flight Hardware Control*

During fabrication, configuration documentation shall be accumulated in the form of a traveler that is kept with the hardware. This traveler shall include or contain reference to the as-built documentation, such as schematics, part drawings, fabrication instructions, part lot date codes, test procedures and results, etc. All changes to flight hardware shall be documented in this traveler. When the hardware is delivered to the suite level, the subsystem engineer shall maintain the traveler, available upon request.

5.3. *Flight Software Control*

The subsystem programmer shall maintain a development log for subsystem's each flight software. This log shall include development and test history of the software, including all problems found and their resolution. This log shall be used to identify and control the software configuration. Upon installation of the flight software into the flight hardware, this log shall become part of the traveler by reference. Flight software shall include a revision code that shall be accessible via telemetry. This revision code shall be traceable to the software build and test history via the software log.

Once integrated into the flight hardware, the flight software shall be subject to the same problem reporting system as the flight hardware, as described in section 4.4.

All versions of the flight software starting no later than the first version loaded into flight hardware shall be archived, including all source code, documentation, etc, such that an earlier configuration can be recreated at any time.

5.4. *Backups*

All controlled documentation and flight software shall be backed up regularly (at least weekly).