



U.S. Customs and Border Protection

– **WHITE PAPER** –
SECURE BORDER INITIATIVE (SBI)
CONFIGURATION MANAGEMENT

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- White Paper - SBI Configuration Management

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1.0 Introduction

This White Paper outlines a proposed Configuration Management process for the SBI program, a major initiative managed by U.S. Customs and Border Protection (CBP), within the Department of Homeland Security (DHS). This White Paper should be understood in relationship to the “CM Self-Assessment Report” (see Addendum) submitted on 29 OCT 2009 to Mr. Steve Karoly, SBI Director of Systems Engineering. Mr. Karoly authorizes and directs the Configuration and Data Management of SBI, along with other SE competencies.

1.1 Topic Background

Major SBI milestones, such as System Acceptance Testing (SAT), proposed Physical Configuration Audits (PCA), and the Mobile Surveillance System (MSS) Reliability Improvement and Re-Engineering (RIRE) project are driving forces for changes to Configuration and Data Management. The lesson learned from the MSS project is that an unreliable baseline is the result of little or no CM processes during the system design and development (SDD) life cycles. Therefore, verification of a Product Baseline, necessary for the Operations & Maintenance (O&M) life cycle is impossible.

Because CBP took possession of 44 MSS units without a certified PCA, an approved Product Baseline was never verified, hence traceability of Configuration Items (CIs) for the Operations and Maintenance (O&M) life cycle phase became a guessing game. The system’s documented configuration items (CIs) were not easily known or relational. Whatever documentation existed at time of delivery, it was not verified for traceability or conformance to the “as-built” system.

As a result, reliability, maintenance, and availability (RMA) of the MSS units spiraled downward, necessitating the supplemental MSS RIRE program now underway with the FAA of Oklahoma City. With better “up-front” CM planning, the RIRE program would not have been necessary. This White Paper outlines a CM policy that constitutes a core business capability within SBI; an enterprise effort of CM, not just a CM that is subservient to SDD engineering effort.

1.2 Traditional CM versus “CMII”

The five (5) traditional CM capabilities for managing configuration items (CIs) and baselines are: (1) Process Planning, (2) Identification, (3) Change Control, (4) Status Accounting, and (5) Verification (Audits). That, in itself, is not an issue. The issues are in how those specific activities are performed. The Institute of Configuration Mgt (ICM), states it better than any other recognized CM organization:

*“The scope of traditional CM is limited to managing design definition and ensuring that physical items conform to the design. The emphasis is on maintaining consistency between products and their designs. It is very difficult to verify conformance and/or achieve consistency when the design, itself, is not clear or concise or valid. There are no provisions for ensuring design integrity. To do so, a fast and efficient change process is a prerequisite. **Traditional CM has no provisions for making the change process fast and efficient.** As a result, those using traditional CM are destined to operate in the corrective action mode and live with inflated costs.” (ICM White Paper: “Traditional CM vs. CMII”)*

It is recommended that SBI borrow CM best-practices as outlined in MIL-HDBK-61A(SE), but infuse the CMII mindset for the “how-to” practicalities in dealing with multiple Contractors and various SBI projects. The CMII model does not scrap the DOD traditional CM activities, and underscores its legitimacy and genesis:

“Configuration management was introduced in the 1960s by the Department of Defense to resolve the inability of defense contractors to build a second unit identical to the first. Design documents used to build the second unit did not accurately represent the first unit.”

“The problem was further exposed when another company won the follow-on contract. The 2nd contractor often had to reverse-engineer an ‘as-built’ unit in order to fix design definition from the 1st contractor. In a nutshell, this is the problem the Department of Defense was trying to solve. The traditional approach to CM evolved out of this effort.”

(ICM White Paper: “Traditional CM vs. CMII”)

1.3 CMII: An Enterprise Approach

CMII takes the five (5) traditional CM capabilities and expands the scope of CM to include any information that could impact safety, security, quality, schedule, cost, profit, or the environment. CMII shifts the emphasis from solely engineering development to integrated process excellence for:

1. Accommodating change;
2. Optimizing the reuse of standards and best practices;
3. Ensuring that all requirements remain clear, concise, and valid;
4. Communicating (1), (2) and (3) to users promptly and precisely;
5. Achieving conformance to requirements in each case.

CMII also promotes continuous improvement in #1 through #5. Metrics and “Lessons Learned” is non-existent at SBI, as documented in the “SBI CM Self-Assessment Report.” CMII encompasses the disciplines below:

Configuration Mgt	Ensures that configurations conform to released requirements
Requirements Mgt	Ensures that documented requirements are clear, concise and valid
Release Mgt	Ensures that documents are authorized and released prior to use
Change Mgt	Keeps released documents and data up to date
Data Mgt	Ensures data bases are accurate and deliverable data is secure
Records Mgt	Retains traceability of work and proof that work products conform
Document Library Control	Protects knowledge assets and prevents unauthorized changes
Enabling Software Tools	Serve to enhance overall process reliability and efficiency

The Systems Engineering Director for SBI – whose apparent mindset for creating a SE model for break-out competencies as reflected in the above table – happens to embrace the “enterprise” approach of the CMII paradigm, whether he knows it as CMII or not. The ensuing SBI outcomes derived from embracing CMII policies would be affected in the “how-to.”

Consistent conformance and continuous improvement are effects, not causes. Eliminating the constant need for intervention resources (reactionary) is the tell-tale sign for achieving consistent conformance.

2.0 Recommended Identification of CIs

2.1 End-Item Bill of Material (BOM)

At this time, an enterprise-wide “SBI Naming Convention” has not been approved, although a draft document is currently being used by the MSS and AWS projects within SBI. Coupled with the CMII model for uniquely

identifying Configuration Items (parts, documents, software, forms, and records), the program should adopt the following illustration in “Figure 1” for traceability of program requirements **AND** program configuration items through all life cycles:

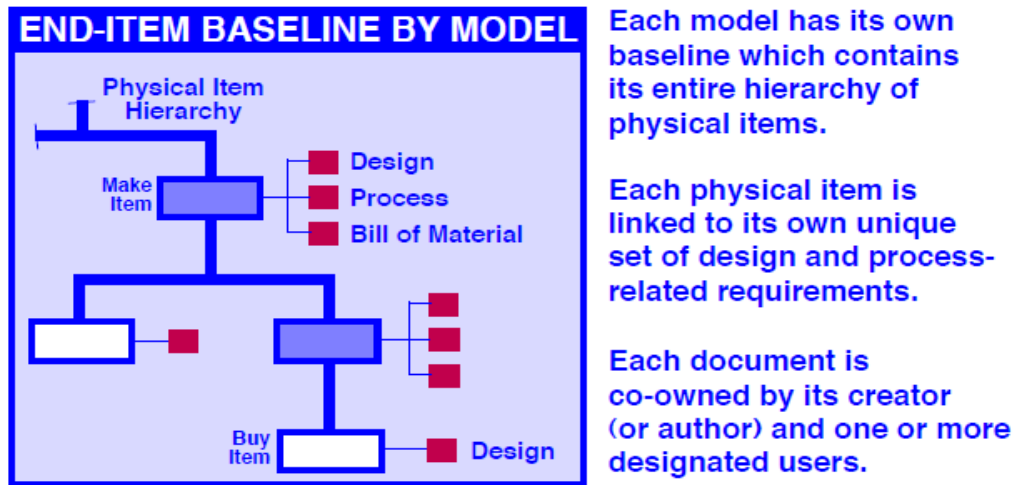


Figure 1 – Identification of CIs
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2.1 Administrative Bill of Information (BOI)

The drafted “SBI Naming Convention” also allows a structure for identification and traceability of administrative “Bills of Information.” These data items (budgets, schedules, SOWs, WBS breakdowns, etc.) may not require formal change boards, but, should nonetheless be archived in an automated repository for traceability of program requirements. Both BOMs and BOIs are shown below in Figure 2:

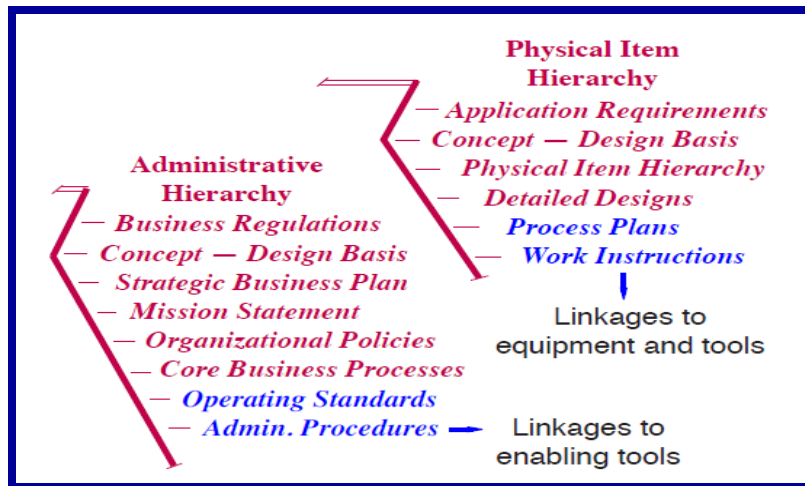


Figure 2 – BOI and BOM Structures
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3.0 Recommended Change Management

At this time, an enterprise-wide “SBI CM Plan” has not been approved, although a draft document is archived. It is written with the traditional DOD change management in mind. It is important to understand the two basic approaches for updating and maintaining baselines. In one approach, approved changes are accumulated against a “fixed” baseline as last approved. Accumulated changes, like moving a stake, are incorporated into the baseline all at once and the new fixed baseline is reapproved. Change status accounting (CSA) is very

complicated and the integrity of released documents is compromised when using fixed baselines. Most times, drawings do not catch up to “as-built” configurations, and are left unchanged when systems are delivered to the Acquirer.

3.1 Baselines: Static “Snapshots” vs. Moving

With the CMII model, baselines and all associated design and process-related documents are upgraded with each approved change. Such "moving" baselines are always current, and any previous version can be retrieved at any time as needed. The specific objectives of each "change board" function must be clearly understood before optimized alignments can be established. Each requested change typically involves three board functions or activities – as shown in Figure 3 below.

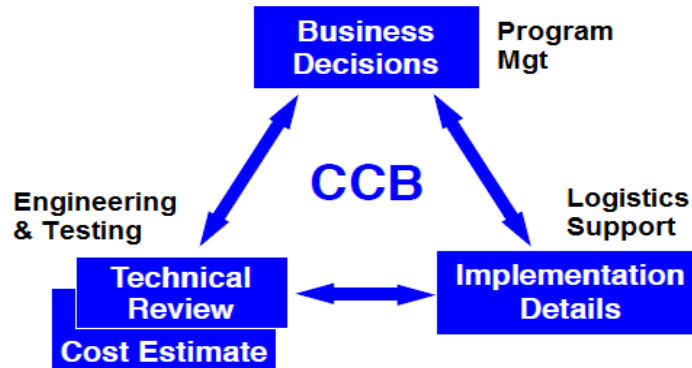


Figure 3 – Change Management’s 3-Fold Activities

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Traditional configuration control boards (CCBs) often mix technical reviews with business decisions and implementation planning details. These three basic change activities must be accomplished in the proper sequence and by the appropriate personnel. This is where the SBI Joint Configuration Control Board (JCCB) finds itself at this present time. Attendees have lamented the time it takes to approve changes, due to detailed technical analysis taking place. Business decisions should be based on expected benefits versus estimated costs, due to requirements (Class I changes) and both are influenced by timing.

3.2 SBI Technical Review Board (TRB) ① Figure 4

The newly formed “SBI TRB” would serve to conduct a review of each requested change and provide a technical analysis and recommendation for preparing an Engineering Change Proposal (ECP), thus, freeing up executives and senior managers, who should not be doing the work of Subject Matter Experts. The SBI CCB should be a board that quickly authorizes the TRB to commence engineering effort for the ECP and then approves the ECP package when it comes back for formal release to an approved Functional, Allocated, or Product Baseline. The operative word for baselines here is “approved,” which means fully known - documented and traceable. This means a complete Technical Data Package with drawings, testing documents, BOMs, etc.). The closed-loop change process shown in Figure 4 is closely coupled with “as-planned / as-released” baselines and associated automated repositories.

3.3 SBI Configuration Control Board (CCB) ② Figure 4

The current SBI “JCCB” needs to be revamped. It is not a “Joint” board, because the Configuration Change Authority (CCA) for Class I changes is solely approved by the Acquirer. The word “joint” means shared CCA. This board should be renamed the “SBI CCB.” A “JCCB” should be applied to the Contractor’s release board because Class II changes are traditionally processed at this board with the full knowledge and subsequent “concurrence” of the Acquirer regarding change class designation (Class I or Class II).

Currently, SBI has no oversight to Contractors' change board activity in concurring with Class II change designations. So, SBI has no real-time mechanism for validation of Class II changes, hence, there is no incremental traceability to program requirements. SBI cannot vouch for Contractor's changes effecting contractual obligations or performance requirements. Subject Matter Experts (SMEs) from the Acquirer should attend the Contractor's joint board. If the Acquirer's attendee(s) feel that any proposed Class II change is a Class I, concurrence is not given and the proposed change is either withdrawn by the Contractor or elevated to the Acquirer's CCB for analysis and disposition.

SBI also finds itself dealing with hundreds of Requests-For-Deviations (RFDs) and Request-For-Waivers (RFW), which is almost always a sign that a program's requirements are either poorly defined, understood, or tracked. With CMII, there are no Deviations/Waivers, just corrected baselines with real-time validation.

3.4 SBI Integrated Logistics Board (ILB) ③ Figure 4

Finally, a newly instituted Integrated Logistics Board (ILB) should implement the change with all the associated effectivities for spares and maintenance as required. The new "SBI ILB" implements approved changes in the field, with appropriate stakeholders notified, and CIs traced for constant status accounting. Without the ILB there is no gathering of field metrics and no "Lessons Learned." Therefore, no manner of reliability, maintenance and availability (RMA) improvements can be compiled.

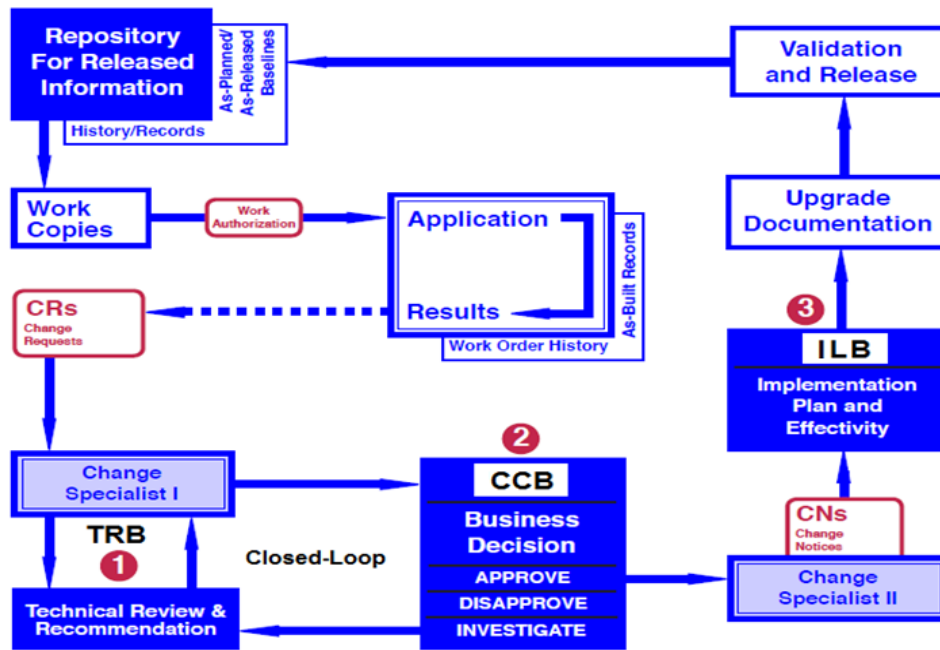


Figure 4 – The SBI JTRB and the JCCB
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4.0 Recommended Standard Operating Procedures (SOPs)

4.1 SBI Configuration Control Board (CCB) Charter

The current SBI CCB is entitled a "Joint" CCB – that is a misnomer, as there is only one (1) CCA. The CCA at this board is the Acquirer only, because Class I changes to the Functional and Allocated baselines are controlled. For Product Baselines, Class I and II changes are approved by this board.

4.2 SBI Configuration Management Plan (CMP)

The SBI program should have its own documented process for the Configuration Management of systems and/or products delivered to the Acquirer (SBI). This CM Plan is usually formally updated as required. The CM Plan, among other things, defines processes for coordinating changes to approved Functional, Allocated, or Product Baselines.

4.3 SBI Integrated Logistics Board (ILB) Charter

The SBI ILB Charter authorizes the roles and responsibilities of the CM process for implementing Product Baselines. This board is chaired by the SBI ILS Director, who reports to the SBI Director of Systems Engineering. The SBI CM Plan would define the processes of this board.

4.4 SBI Process Advisory Committee (PAC) Charter

The SBI PAC is made up of SBI executive and senior stakeholders who analyze and approve enterprise-wide changes to program processes. This board can be chaired by the SBI Process Engineer, who reports to the SBI Director of Systems Engineering. The SBI CM Plan would define the processes of this board.

4.5 SBI Naming Convention Guide

The first job of CM is to identify configuration items (CIs) for purposes of change control and traceability to program requirements. This is impossible without an enterprise-wide Naming Convention. This document needs to be thoroughly vetted by enterprise stakeholders. See the Addendum for a draft.

Once approved and released, the enterprise must apply and enforce these policies. Like any governing document or Standard Operating Procedure (SOP), these documents are recommended for change by the SBI PAC and must go through the SBI TRB and SBI CCB for release.

5.0 Recommended Contractor Compliances to SBI CM

5.1 Contractor Configuration Management Plan (CMP)

Any contractor should have a documented process for their Configuration Management, with the review and concurrence of SBI. This CMP is usually formally updated as required. An effective, well-defined configuration control process assures the SBI Program Management Office (PMO) that all changes to SBI-controlled baselines, no matter how small or seemingly insignificant, have due-process. Without effective configuration control, the program runs the risk of delivering CIs with configurations that:

- Are technically inadequate and fail to meet requirements
- Lack accurate historical records as a basis for future change
- Are not logistically supportable
- Results in wasted resources
- May be unsafe

– ADDENDUM –

“SBI CM Self-Assessment Report”



SBI CM Assessment

“SBI Naming Convention Procedure”



SBI Naming
Procedure