FD24-CM01
Revision A
February 24, 2003

PRESSURIZED CARRIERS GROUP

FLIGHT PROJECTS DIRECTORATE

CONFIGURATION MANAGEMENT PLAN

Prepared by:
Engineering Directorate
Engineering Systems Department
Configuration and Data Management Group
Flight Projects Team

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MSFC PRESSURIZED CARRIERS CONFIGURATION MANAGEMENT PLAN

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1.0 INTRODUCTION

The MSFC Pressurized Carriers (PC) Group Configuration Management Plan defines requirements, responsibilities, and procedures for the configuration management (CM) system. This system will be applied to the Pressurized Carriers development and integration activities at MSFC.

It should be recognized here that all of the Pressurized Carriers (MPLM'S) have been delivered to KSC. The Pressurized Carriers Group activity is primarily a sustaining and integration activity for the core element. This effort consists of the review of all program changes (including interface documentation) that could affect the modules, conducting special studies for efficiency of operations at the users site, providing hardware modifications to the pressurized modules when directed to do so by the program, and in conjunction with the International Developer, Alenia, maintain technical cognizance of all aspects of the modules.

MSFC Pressurized Carriers configurations will be identified by baselining technical documentation at progressive project milestones. The hardware/software baseline will progress from requirements to detail design to hardware and software products through this baselining process. Any changes to baselines will be controlled and verified through the CM System described in this plan.

This plan meets the requirements of MPG 8040.1, MWI 8040.1, MWI 8040.2, MSFC-STD-555, SSP 41170, and SSP 50123-01.

Specific project appendices are included as required. The appendices include document and drawing signature matrices for most efficient operations for in-house applications.

1.1 OBJECTIVES

The CM System provides the project with a formal method to meet the following objectives:

a) Identify and document the technical requirements of all Configuration Items (CI), Computer Software Configuration Items (CSCI) or units.
b) Control changes/deviations/waivers to these technical requirements.
c) Record and report change processing and implementation status.
d) Verify change incorporation.
e) Verify performance, design, and configuration through design reviews and verification documentation.

1.2 ABBREVIATIONS AND ACRONYMS

BCE	Board Change Evaluation
CCB	Configuration Control Board
CE	Change Evaluation
CI	Configuration Item
CM	Configuration Management
CMO	Configuration Management Office

CPE	Change Package Engineer
CPTAS	Change Processing, Tracking, and Accounting System
CR	Change Request
CSCI	Computer Software Configuration Item
CWC	Collaborative Work Commitment
DCN	Document Change Notice
DR	Discrepancy Record
PC	Pressurized Carriers
EI	End Item
FCA	Functional Configuration Audit
FEC	Field Engineering Change
FRR	Flight Readiness Review
ICMS	Integrated Configuration Management System
ICD	Interface Control Document and Integration Control Document
ICWG	Interface Control Working Group
IDD	Interface Definition Document
IRN	Interface Revision Notice
ISS	International Space Station
ISSA	International Space Station Alpha
LMC	Lightweight Mission Peculiar Equipment Support Structure (MPESS) Carrier
MFRR	Management Flight Readiness Review
MPLM	Multi-Purpose Logistics Module, Mini Pressurized Logistics Module
PCA	Physical Configuration Audit
PCD	Program Control Directive
PCI	Payload Carriers Integration
PIRN	Preliminary Interface Revision Notice
PRR	Project Requirements Review or Preliminary Requirements Review
SCM	Software Configuration Management
SSCN	Space Station Change Number
SSP	Space Station Program
SSR	Software Specification Review
TCM	Technical Coordination Meeting
TRR	Test Readiness Review

2.0 APPLICABLE DOCUMENTS

The following documents of the latest issue unless exact issue shown form a part of this plan to the extent specified in the text. Within the text of this plan, reference to the applicable documents listed below is by basic number only.

NPG 7120.5	NASA Program and Project Management Processes and Requirements
SSP 30459	International Space Station Interface Control Plan

SSP 41170,	ISSA Program CM Requirements
SSP 50123-01	ISSA CM Handbook
MPG 1440.2	MSFC Records Management Program
MPG 8040.1	Configuration Management, MSFC Programs and Projects
MPG 8060.1	Flight Systems Design/Development Control
MPG 8730.3	Control of Nonconforming Product
MWI 8040.1	Configuration Management Plan, MSFC Programs/ Projects
MWI 8040.2	Configuration Control, MSFC Programs/Projects
MWI 8040.3	Deviation and Waiver Process, MSFC Programs /Projects
MWI 8040.7	Configuration Management Audits,MSFC Programs/Projects
MWI 8730.3	MSFC Material Review System
MSFC-STD-555	MSFC Engineering Documentation Standard
MSFC-MNL-1951	Change Processing, Tracking, and Accounting System User's Guide
JA91-QP01	MSFC Space Station Development Office Quality Plan for Spacelab Logistics Pallet
MIL-STD-130F	Identification and Marking of U.S. Military Property
MIL-STD-498	Defense System Software Development
MIL-STD-973	Configuration Management
MIL-STD-1521B	Technical Reviews and Audits for Systems, Equipments, and Computer Software
MWI 8040.5	Floor Engineering Orders and Floor Engineering Parts Lists (FEO's/FEPL's)
FD23-DM-001	PC Group Data Management Plan
MDC G6817E	MDA-HSV Spacelab Configuration Management Plan
MWI 8040.6	Functional and Physical Configuration Audits, MSFC, Program/Projects
Global Engineering	Drawing Requirements Manual, ninth edition 1995

MSFC-STD-2806	MSFC Tailoring Guide for the Global Drawings Requirements Manual (GDRM) Ninth Edition

3.0 ORGANIZATION

CM provides a disciplined method for establishment, control, accounting, and verification of the project baseline. The CM system helps ensure that technical requirements are identified and documented, accurately translated into the design, and that the design is translated correctly into hardware/software. The MSFC Pressurized Carriers Group controls requirements and hardware/software definition through Level III configuration control boards chartered by the Pressurized Carriers Group Leader with baselined Effectivity Charts. The following paragraphs define the CM responsibilities of the Pressurized Carriers Group Space Station activities at MSFC.

3.1 MSFC PRESSURIZED CARRIERS GROUP LEADER

The MSFC Pressurized Carriers Group Leader will authorize and ensure compliance with the policies, requirements, and procedures stated in this plan and shall chair the MSFC Pressurized Carriers Group Level III Configuration Control Boards (CCB).

3.2 MSFC PRESSURIZED CARRIERS PROJECTS

The MSFC Pressurized Carrier Group Project shall address all proposed changes, change evaluations and issues through the respective CCB and submit coordinated change requests or evaluations to the appropriate PC CCB for disposition.

3.3 MSFC FLIGHT PROJECTS SUPPORT TEAM, CONFIGURATION AND DATA MANAGEMENT GROUP/ED43

The Flight Projects Team has the following responsibilities as negotiated with the Pressurized Carriers Group, Teams and Projects through the CM Collaborative Work Commitments:

a) Assist each Project Manager and Team Lead in developing and maintaining this CM Plan and the appendices which outline specific project CM requirements and operating procedures.
b) Assure management compatibility of the CM systems established by the MSFC Space Station elements with interfacing program elements and institutional CM elements and monitor the overall operation of CM to ensure an efficient system.
c) Provide guidance to MSFC Pressurized Carriers and associated project personnel regarding procedures for baselining, document release, change package preparation, and document maintenance.
d) Provide a secretariat for the Pressurized Carriers Group CCB'S to process change packages, schedule CCB meetings and document CCB decisions.
e) Maintain master change files for CCB actions.

f) Track change actions using the MSFC Change Processing, Tracking and Accounting System (CPTAS) as defined in MSFC-MNL-1951.
g) Establish CM requirements for any future MSFC External Carrier Projects or Contracts and monitor implementation.
h) Assist in verifying that hardware/software is fabricated in accordance with the released documentation configuration audits.
i) Perform periodic CM Audits to verify adequacy of the CM System as defined in MWI 8040.7
j) Provide As-Design/As-Built Reporting for MSFC in-house hardware

3.4 FD24 PROJECT ENGINEERING DIRECTORATE PERSONNEL

Each affected Engineering Directorate team will provide technical support to MSFC Space Station elements, to include the following CM responsibilities:

a) Identify and document requirements and detail design in specifications and drawings.
b) Provide membership on the CCB'S as required by the Project Managers.
c) Evaluate Change Packages.
d) Act as Change Package Engineer (CPE) for a change package when designated.

3.5 SAFETY AND MISSION ASSURANCE (S&MA) OFFICE

S&MA will provide CM support as specified in JA91-QP01, the respective project plans and the Collaborative Work Commitments (CWC) for S&MA. Specific responsibilities include:

a) Provide membership on the CCB'S.
b) Review program and project changes for S&MA acceptability.
c) Act as CPE for S&MA related change packages.
d) Provide as-built report.

3.6 FLIGHT SYSTEMS SUPPORT TEAM, RESOURCES GROUP

Flight Systems Support Team, Resources Group personnel will serve on the CCB'S to evaluate cost and schedule impacts.

4.0 CONFIGURATION MANAGEMENT PHASING AND MILESTONES

Program phasing and milestones shall be per NPG 7120.5. Specific project milestones shall be as identified in the respective Project Plans. The Pressurized Carriers Projects are controlled through the CCB Structure by Pressurized Carriers Charter Memoranda, associated effectivity Sheets (MSFC-Form 4341), and Section 8.0 of this Plan.

5.0 DATA MANAGEMENT

The Pressurized Carriers Group Data Management is defined in the FD23-DM-001. Each project will define a project unique Data Management Plan or list the requirements in the Project Plan.

6.0 CONFIGURATION IDENTIFICATION

All Pressurized Carriers (MPLM) Configuration Items have been designed, developed and delivered. Design Reviews and Functional and Physical Configuration Audits have been completed. Section 6.0 of this document shall only apply against future additional Configuration Item design and development.

The MSFC Space Station elements will be defined in configuration item (CI) or computer software configuration item (CSCI) specifications or equivalent. Configuration identification is defined by approved technical documentation, consisting of specifications, drawings and associated lists, and documents referenced therein. After each project review, the baseline for a given CI or CSCI is established and the specific documentation constituting that baseline is placed under formal control. Configuration identification also includes unique numeric identification of the hardware/software in compliance with MWI 7120.3 and as defined in FD23-DM-001. Documentation that is submitted to the SSPO for formal baselining will be released under a Space Station Change Number (SSCN) as provided by Space Station Program Configuration Management.

6.1 CONFIGURATION BASELINES

Configuration baselines are defined in MPG 8040.1. Baselines consist of increasingly detailed documentation as the project progresses. Functional, Development and Product Baselines or their equivalent shall be established upon successful completion of the appropriate design reviews.

6.2 IDENTIFICATION NUMBERS

Identification numbers will be assigned to control and account for the configuration of all CI's, CSCI'S, and related equipment and documentation per the requirements of MPG 8040.2. MPG 8040.2 requires design organizations to specify product identification in design documentation in accordance with MSFC-STD-555. Product identification includes part numbers, serial numbers or lot numbers, and Commercial and Government Entity (CAGE) codes. MSFC-STD-555 specifies the MSFC part numbers consist of the drawing number and a unique dash number. For MSFC-designed equipment, serial and lot numbers are assigned by the MSFC Release Desk. Design organizations will specify the requirement for serialization on engineering drawings and manufacturing organizations will specify the requirement for serialization on engineering drawings, and manufacturing organizations will apply the product identification numbers to the hardware items. Organizations handling hardware must ensure that product identification is implemented and maintained when the hardware is in their control. For the Pressurized Carriers Projects, all Project CI's must be serialized. Identification and traceability requirements for other project hardware will be determined by each External Carrier project and supporting design organization in accordance with MPG 8040.3.

Document and drawing identification numbers will be assigned as described in section 6.3 and 6.4.

6.3 CONFIGURATION DOCUMENTATION

Configuration documentation is the technical documentation that defines the functional and physical characteristics of the CI. Configuration documentation consists of specifications, ICD'S, and drawings and associated lists.

6.3.1 SPECIFICATIONS

The project shall document all CI or CSCI requirements in specifications. The specification content shall be in accordance with MWI 7120.4. If the specification was baselined prior to October 6, 2000, the specification shall be formatted in accordance with MSFC-STD-555C. If the specification was baselined after October 6, 2000, the specification shall be formatted in accordance with MWI 7120.4. Specifications shall be numbered in accordance with MWI 7120.4 with a MSFC-SPEC-XXXX type number, where XXXX is a sequential number assigned by the MSFC Release Desk.

6.3.2 INTERFACE CONTROL DOCUMENTS (ICD'S)

The project shall document all interface requirements in ICD'S. If the ICD was baselined prior to October 6, 2000, the ICD shall be formatted and numbered in accordance with MSFC-STD-555C, where the ICD number is an ICD-3-XXXXX type number, where "3" indicates the control level, and XXXXX is a sequential number assigned by the MSFC Release Desk. If the ICD was baselined after October 6, 2000, the ICD shall be formatted and numbered in accordance with MWI 7120.4, where the ICD number is a MSFC-ICD-XXXX type number, where XXXX is a sequential number assigned by the MSFC Release Desk.

6.3.3 DRAWINGS

Project detailed design shall be documented in drawings and associated engineering parts lists (EPL). Drawings and parts lists shall be formatted and numbered in accordance with MSFC-STD-555, the Global Drawing Manual, and MSFC-STD-2806. The MSFC Release Desk Personnel will assign drawing numbers.

6.4 CONFIGURATION DOCUMENTATION APPROVAL AND RELEASE

Configuration documentation must be approved through a CCB. Initial CCB approval utilizes the same procedures as the configuration control process described in section 8.0. MSFC in-house hardware or MSFC procured hardware configuration documentation that defines hardware that will be received and accepted on-site at MSFC must be approved through a CCB and released through the MSFC Release Desk.

Utilization of the CCB and MSFC Release Desk requirements ensure compatibility with the MSFC quality and manufacturing systems. Release through the MSFC Release Desk ensures

that documentation meets MSFC requirements and ensures recording of the as-designed configuration in the Integrated Configuration Management System (ICMS). The ICMS produces the Indentured Parts List/As-Designed Configuration Report.

CDM Group/ED43 personnel staff the MSFC Release Desk. CCB operation requirements are defined in MWI 8040.2 and requirements for release through the MSFC Release Desk are defined in MSFC-STD-555.

6.5 NON-CONFIGURATION DOCUMENTATION APPROVAL AND RELEASE

Non-configuration project documentation may be approved through the CCB as determined by the Pressurized Carriers Project Managers. Format and numbering of non-configuration documentation is specified in SLS-JA21-001. Approval and control of non-configuration documentation, which is not controlled through the CCB, is described in SLS-JA21-001. Non-configuration project documentation, whether CCB controlled or project approved, is released through the Pressurized Carriers project release function per SLS-JA21-001. Pressurized Carriers Group DM personnel provide document release for the Pressurized Carriers projects.

7.0 INTERFACE MANAGEMENT

MSFC Level III ICD documentation and change procedures are described in sections 8.4 and 8.5. ISS Program ICD management requirements are defined in SSP 30459 and SSP 41174.

8.0 CONFIGURATION CONTROL

Configuration control is the systematic definition, evaluation, coordination, and disposition of each proposed change, deviation, or waiver, and the implementation of each approved change in the project configuration through a formal change control system. All changes to the configuration baselines shall be formally controlled as specified in Sections 8.1-8.11.

As stated in Paragraph 6.0, since all Pressurized Carriers have been delivered, any reference to the design, development, change control and release of design documentation is predicated on the incorporation or addition of Configuration Items into the project.

8.1 CCB CONTROL LEVELS

The control of programmatic changes, engineering changes, deviations and waivers to MSFC Pressurized Carriers hardware/software will be achieved through the use of the configuration control boards (CCB). The program/project organizations and CCB'S established at each authority level, which apply to the MSFC Pressurized Carriers Project are shown in Figure 2 and described in the following paragraphs.

The levels of authority, and office of responsibility, established for the MSFC Pressurized Carriers Space Station projects are as follows:

Program Manager, Space Station Program Office (SSPO), JSC
MSFC Pressurized Carriers Group Lead (Pressurized Carriers Project/Team CCB'S)
Team Leader (Team CCB responsibility as delegated by Pressurized Carriers Group Lead)
Project Manager (Project CCB responsibility as delegated by Pressurized Carriers Group Lead and Team Leader)

The controls established at each level are described in the subsequent sections and represented in Figure 2. The Space Station Program has not chartered a Level I CCB. The Pressurized Carriers Projects/teams have not chartered level IV CCB'S. The appropriate Level III Pressurized Carriers CCB will handle all Level IV CCB functions.

8.1.1 SPACE STATION PROGRAM OFFICE, JSC

The Space Station Program Office (SSPO) will control the ISS systems and segment specifications. Specific interfaces with International Partners will be controlled at this level. The change control process identified in SSP 50123-01 is equivalent to a Level II CCB as specified in MPG 8040.1

8.1.2 MSFC PRESSURIZED CARRIERS GROUP

MSFC Pressurized Carriers Project is controlled through the MSFC Pressurized Carriers Level III CCB. The CCB baselines and controls changes to project element specifications and other project element documents, as required. The CCB baselines and controls changes to Interface/Integration Control Documents (ICD'S) or Interface Definition Documents (IDD'S) when the interface control is delegated by the SSPO. Drawings shall be baselined and controlled as specified in the appendices. The MSFC Pressurized Carriers Office CCB is detailed in the following subparagraphs and CCB activities are illustrated in Figures 3 through 5 or as otherwise noted in the project appendices to this plan, when included. Where Project appendices are not included, the basic portion of this plan is applicable in its entirety

For elements or activities related to the Payload Carriers Integration (PCI) Contract, the contractor will coordinate with the responsible Systems Engineer and submit an appropriate change, ECP/ECR to MSFC for approval.

8.1.2.1 MSFC PRESSURIZED CARRIERS GROUP CCB

The MSFC Pressurized Carriers CCB is responsible for documentation controlling all aspects of the PC Projects/Teams, including baselining of this CM Plan, overall development schedules and implementation of SSP requirements

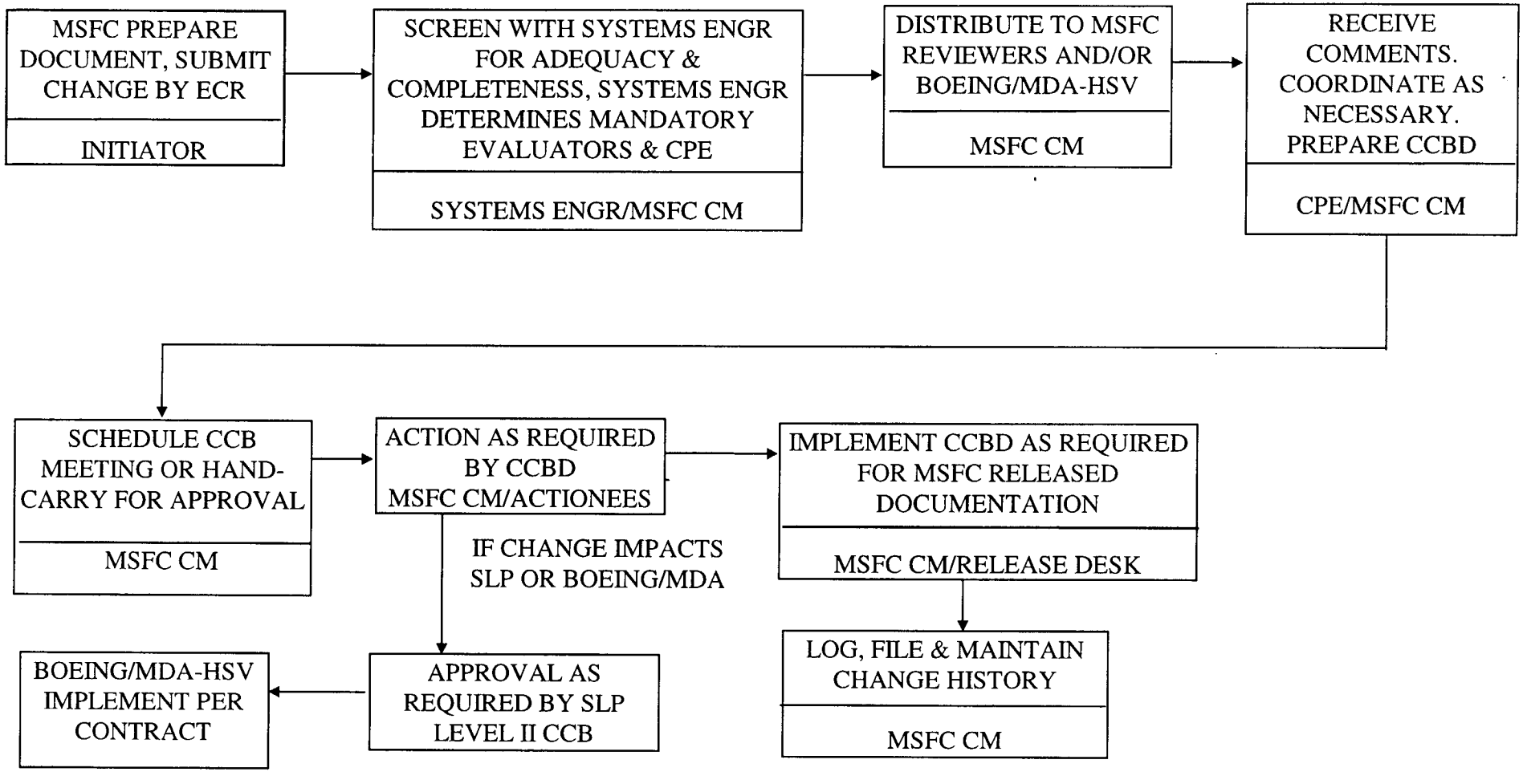


FIGURE 2. PROCESS MSFC SUBMITTED CHANGES

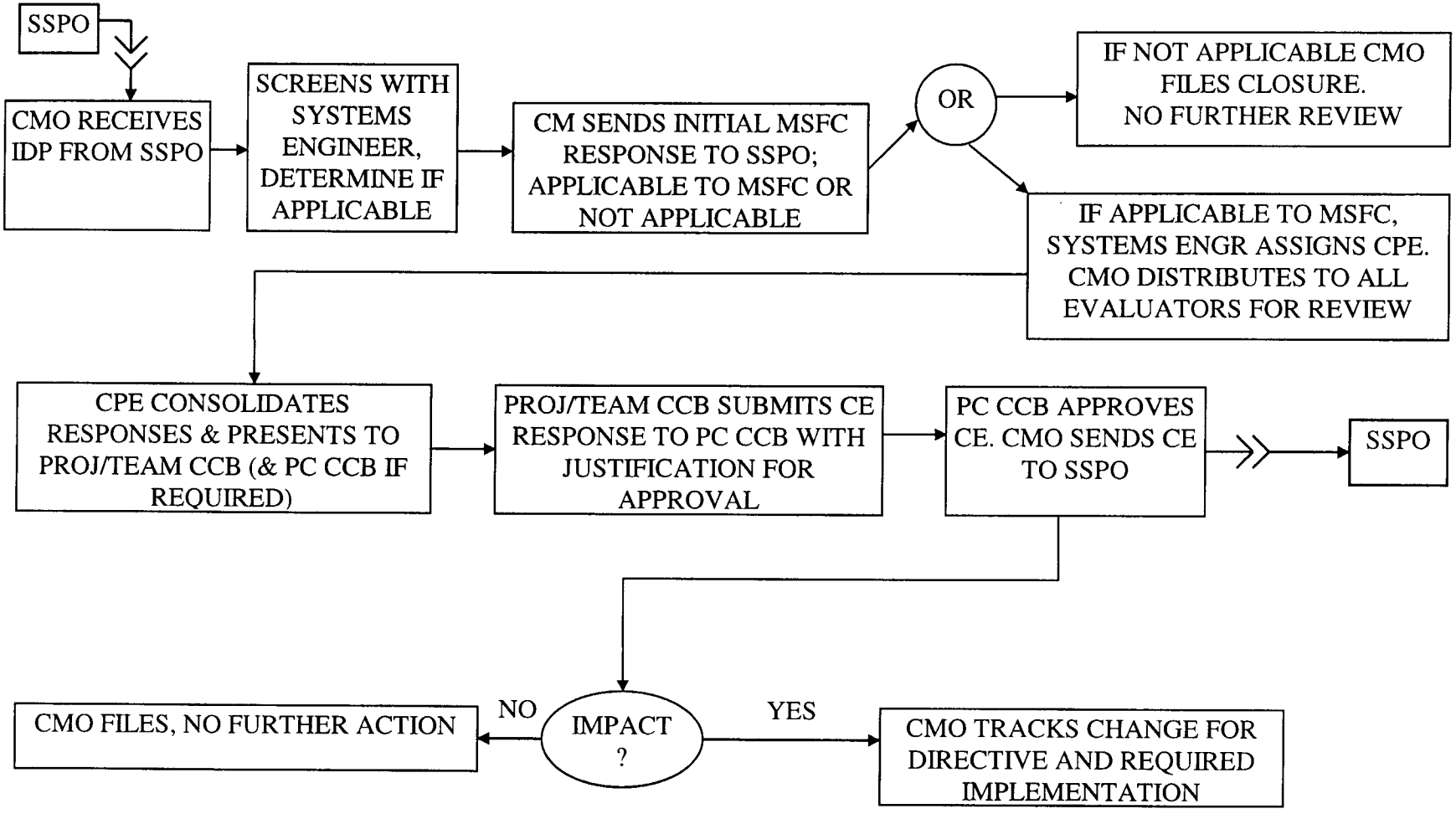


FIGURE 3. EVALUATION AND RESPONSE TO SSPO CHANGE REQUESTS

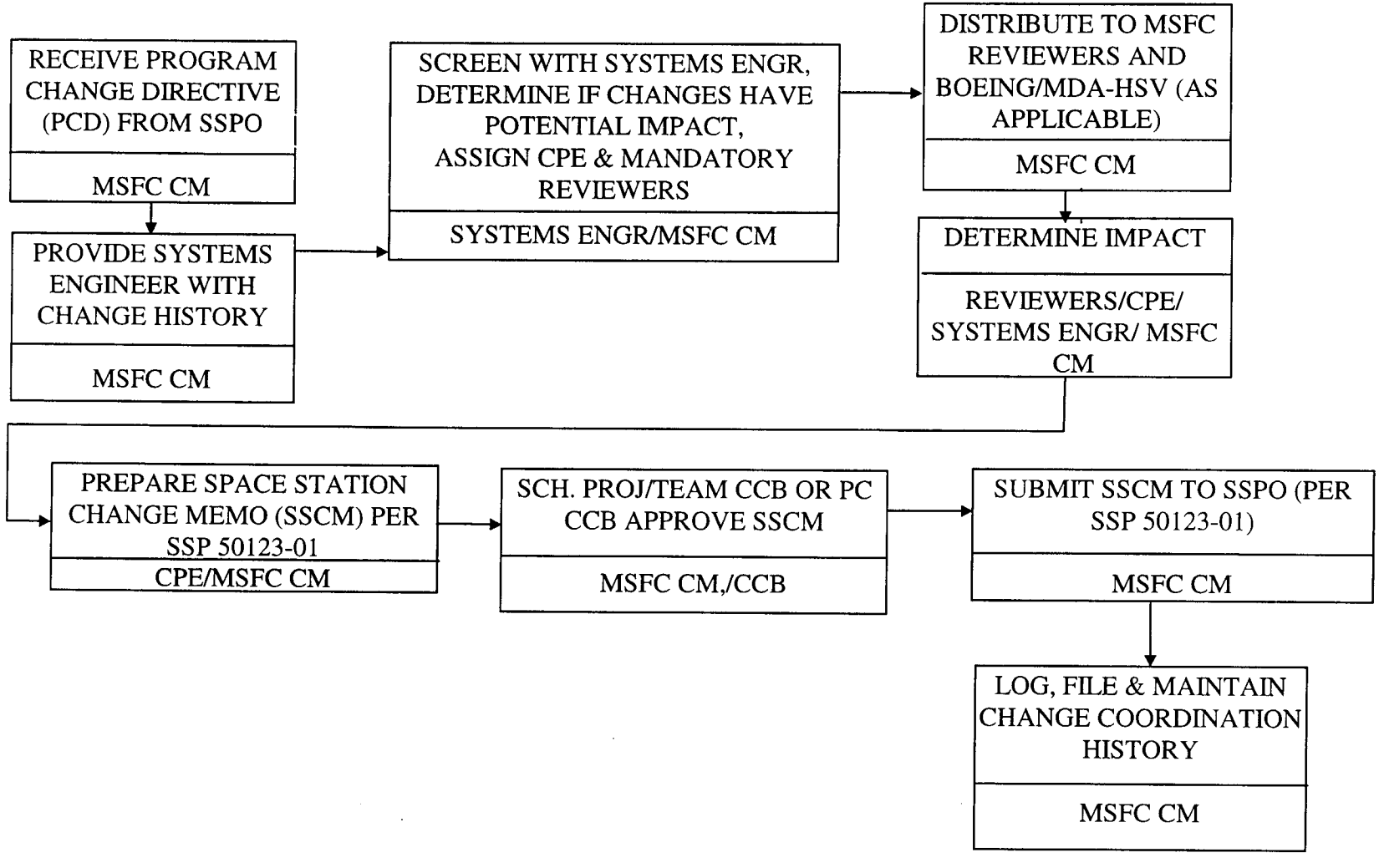


FIGURE 4. REVIEW/IMPLEMENT SSPO CHANGE DIRECTIVES

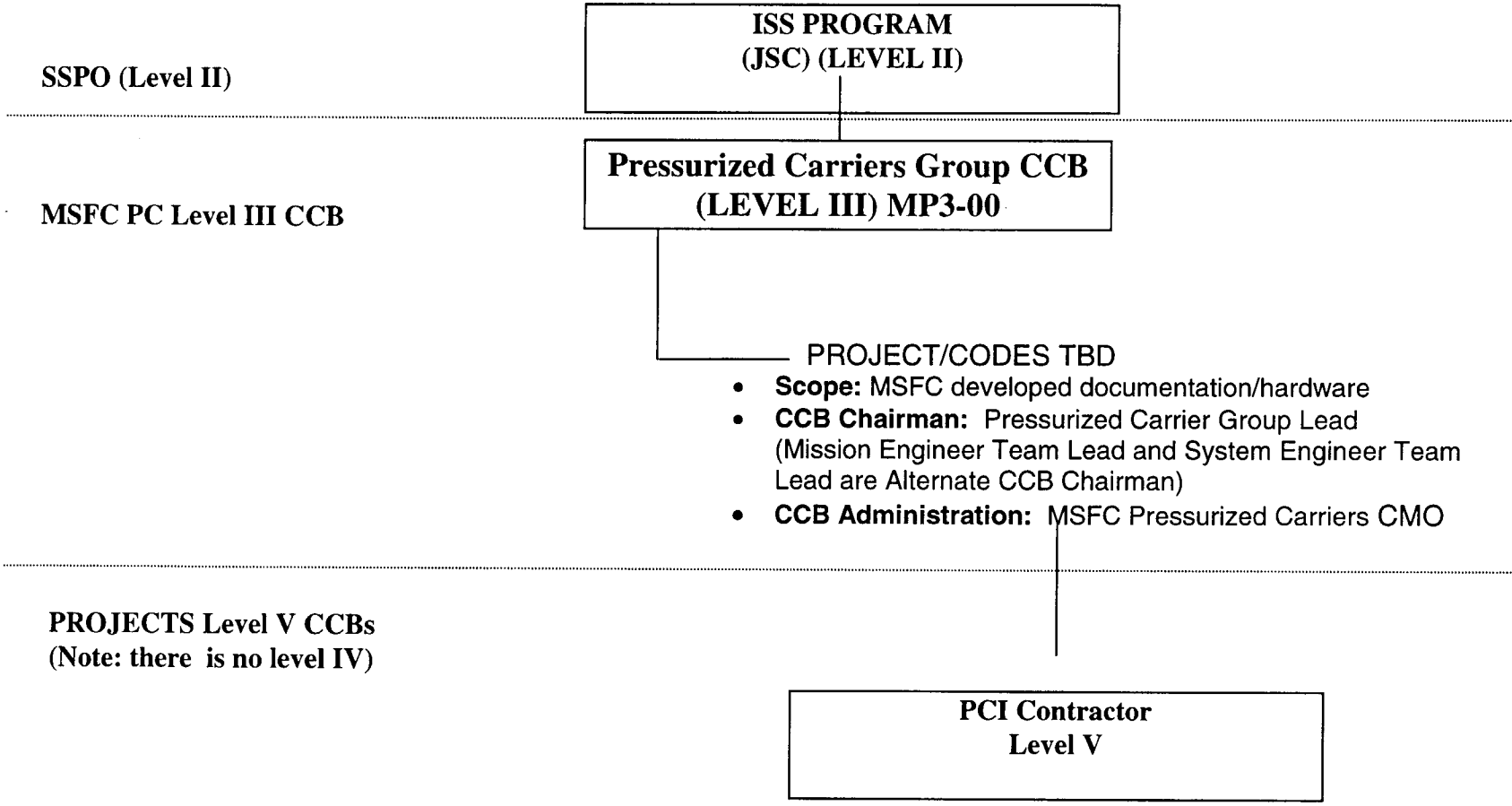


FIGURE 1: MSFC PRESSURIZED CARRIERS GROUP CCB ORGANIZATION

that are applicable to two or more Pressurized Carriers Projects/Teams. The Pressurized Carriers Group Lead is the CCB Chairman of the Pressurized Carriers General CCB and all sub CCB'S.

8.2 DISPOSITION AND CONTROL OF CHANGES

The Pressurized Carriers CCB Chairman will sign all CCBD'S or Change Evaluations to SSPO changes. For in-house effort, CCBD signature authority for drawings, engineering parts lists, and associated changes may be delegated to a lower level if indicated in the respective project/team appendix to this plan. The signature matrix and super signature authority for the project is contained in the project appendix.

Baselined changes will be approved, approved/disapproved by a Configuration Control Board Directive (CCBD). The CCBD shall specify one of the following dispositions:

a) Approved.
b) Approved with changes. Specific changes shall be clearly stated on the directive.
c) Disapproved. Reason for disapproval shall be stated on the directive.

The chairman or alternate chairman may also defer the change to a later date. The CCBD shall document actions, actionees, and suspense dates necessary to implement the authorized change. The CCBD shall be filed in the CMO and as a minimum copies shall be sent to the change initiator and all actionees. Both MSFC in-house and contractor actionees shall provide evidence of closure of the action to the MSFC CMO.

8.3 CHANGE PRIORITIES

Change processing priorities for MSFC changes shall be as specified in MPG 8040.1. For contracted items, priorities for change processing shall be as defined in the contract.

8.4 CHANGE DOCUMENTATION

Specifications and drawings, which define hardware/software requirements and design, shall become part of the formal project baseline. Other types of project documentation such as management plans shall be controlled as defined in the FD24 Project Plan. When technical coordination has been completed, Specifications and other technical requirements documents shall be submitted by Engineering Change Request (ECR) for official baselining. Subsequent to formal baselining, changes to MSFC specifications and documents require the submittal of an ECR to the CCB detailing the change and its justification. MSFC change submittal and document revision procedures are defined in MSFC-STD-555.

Prior to drawing release, drawings are controlled by the developing engineer with no CM oversight. Changes to MSFC drawings will be processed via the CCB in accordance with the guidelines of Figures 1A through 1D. Drawings, revisions, EO'S and EPL'S signature authority will be as specified in each project appendix. Baseline control of contractor drawings will be accomplished in accordance with approved contractual configuration management plans. As a

minimum, EO'S for top assembly and major sub-assemblies shall be incorporated into drawing revisions prior to hardware delivery.

8.4.1 FLOOR EO'S AND FLOOR EPL'S

Floor EO'S and floor EPL'S will be utilized in accordance with MSFC-STD-555, MWI 8040.5, and Figure 1.

8.4.2 EO'S AND EPL'S RESULTING FROM FEC'S

EO'S and EPL'S resulting from FEC'S shall be limited to the change identified on the FEC and shall identify the FEC in the EO reason block or in the EPL in the revision description.

8.5 PROGRAM CONTROL NUMBER (PCN)

The PCN is a unique identifier assigned by the CMO to a change package to assure complete change packaging and continuity in the overall tracking, statusing, and accounting activities for each change processed through the system. The PCN is recorded on each piece of change documentation within a change package. All related change inputs will be identified using the same PCN, and become part of the same PCN file. The CMO will maintain a log of all PCN'S issued. Revision letters, digits, or other modifiers for PCN'S are prohibited. See Figure 2.

8.6 CHANGE PROCESSING AND EVALUATION

All elements will conform to the following established procedure for processing and evaluating change requests. These procedures provide a consistent and efficient change process.

The CMO will be the focal point for the processing of all in-house and SSPO changes. When a change is received, the CMO will initiate the opening of a Program Control Number (PCN) file, in which all the related documentation pertinent to the change will be stored, and will initiate the action to enter the change into CPTAS at MSFC. The CMO will confer with the CCB chairman or alternate chairman/Systems Engineer, either through a screening group meeting or individually, to identify the CPE and any other individuals or organizations that may be impacted by the change, and determine from whom evaluations are required. The change request will be distributed to the mandatory evaluators and others as determined by the screening group. Notification will be provided identifying the CPE, the scheduled board date and a suspense date for responding to the CPE. The transmittals may be by hard copy or electronic mail.

Design Leads will take action to evaluate the change for subsequent CCB action. Within the suspense time frame, the individual evaluators will review the change from their perspective and complete their change evaluations (CE) on the form provided in the change review package. Each evaluating element will forward the CE to the CMO and the CPE. The CPE will establish a unified position regarding the change and prepare a consolidated change evaluation. The CMO will assist the CPE in preparing the appropriate change documentation. The CMO will file all pertinent information in the PCN file. In the event a CPE receives a non-concurrence CE, the

CPE must work to resolve the disagreement. Disagreements that cannot be resolved between evaluators or design activities will be resolved by the CCB.

For changes involving SSPO baselined documentation the responsible individual will generate a Space Station Change Request (SSCR). After boarding at the responsible MSFC CCB the SSCR will be submitted to the SSPO NASA CM Receipt Desk for processing through the appropriate Space Station Control Board (SSCB) for technical approval. The SSCR will then be processed in accordance with SSP 50123.

Space Station Program level and Space Station to Space Shuttle ICD'S and PIRN'S are processed through the Interface Control Working Group (ICWG) in accordance with SSP 30459. PIRN processing is detailed in Figure 7.

Cargo Element Integration Control Documents (ICD-B) prepared by Boeing/MDA-HSV will be submitted to the appropriate Project CCB for coordination and will be approved by the Pressurized Carriers CCB.

8.7 DEVIATION AND WAIVERS

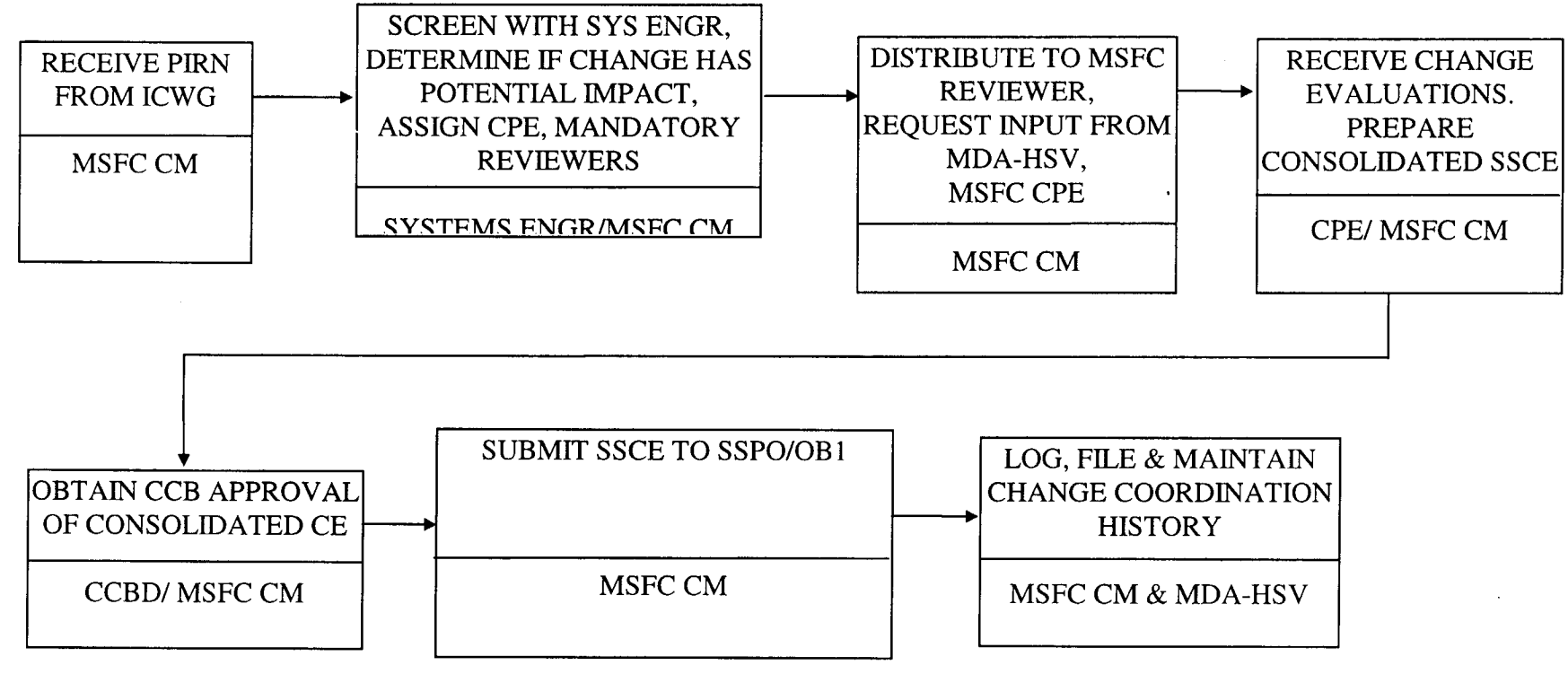
Deviations and waivers are proposed departures from requirement or hardware baselines. Deviations and waivers shall be submitted on Deviation/Waiver Approval Request Forms (MSFC Form 847) per the requirements of MWI 8040.3 and shall be approved/disapproved by the responsible Board. As authorized by MPG 8730.3, the organizational Material Review Board (s) if chartered by a project/team appendix, or by the MSFC Material Review Board, and documented on Discrepancy Record (DR) forms shall process minor non-conformances not impacting level III requirements.

8.7.1 DEVIATIONS

A deviation is a specific written authorization, granted before manufacture, to depart from a particular baseline requirement for a limited application.

8.7.2 WAIVERS

A waiver is a written authorization accepting a departure, after occurrence, from a baseline requirement, normally limited to a single application or end item.



(1) Individual change evaluations may be by telephone, e-mail or other informal means if the process is approved by the project manager or CCB chairman, but the evaluation must be documented in the change file.

FIGURE 5. SPACE STATION PIRN PROCESSING FLOW

8.7.3 DEVIATIONS AND WAIVERS AFFECTING ICD'S

A proposed deviation or waiver that affects an ICD shall require submittal of a DAR. The deviation or waiver shall only apply to the EI effectivity on which the departure condition exists. The DAR will be transmitted to both sides of the affected interface for evaluation.

8.8 FIELD ENGINEERING CHANGE (FEC)

The FEC is used to authorize engineering changes to hardware at a NASA using site when time constraints do not allow preparation of an ECR/ECP by the design organization. KSC initiated FEC'S will be sent to the MSFC Project Systems Engineer or Project Manager who will coordinate the change with the design organization and CM for approval, tracking and release of the resulting design documentation. KSC initiated FEC numbers are assigned and controlled by KSC CM. The FEC shall be limited to one serial numbered item effectivity. Subsequent to approval of the FEC, the design organization shall submit an ECR or ECP with EO'S and/or EPL'S for baselining to update the design documentation and to direct changes in other serial numbered items of the same EI. KSC CM will document incorporation of the FEC on the KSC As Built Configuration List and provide evidence of incorporation to MSFC.

8.9 MODIFICATION KITS

After delivery and acceptance of a CI from or to another NASA agency or contractor, modification may be required to incorporate approved changes or correct non-compliances. If Hardware or Software is required from the delivering agency, it shall be provided as a modification (mod) kit. The mod kit shall be proposed by change request and approved by the appropriate CCB before shipment. Mod kits shall be shipped by DD Form 1149, Government Shipping Document, by MSFC, or by DD Form 250, Transfer of Property, by contractors. A copy of the DD Form 1149 or DD Form 250 shall be forwarded to the CMO.

The mod kit shall contain all the hardware/software/documentation needed to correctly incorporate the required change. Modification Instructions will serve as a checklist for kit completeness and provide instructions for accomplishing the modification. The Modification Instructions should include the following information: Modification Instructions title, Modification Instructions number, authorizing change request number and PCN, date, any spares or manuals affected, safety considerations, Modification Instructions purpose, effectivity, list of parts/materials/documentation contained in the kit, instructions for mod kit installation, a list of any validation requirements, special handling/tools/safety equipment/test equipment required, estimated man-hours required, who prepared the kit, and who inspected the kit before shipment.

KSC will document installation of the Mod Kit on the KSC As Built Configuration List and provide evidence of incorporation to MSFC.

9.0 CONFIGURATION STATUS ACCOUNTING

Configuration status accounting at MSFC as specified in MPG 8040.1 shall be accomplished by the CMO using the MSFC Change Processing Tracking, and Accounting System (CPTAS).

Implementation and utilization of CPTAS shall be as specified in MSFC-MNL-1951. CM status reports shall be generated and distributed as required by project management. Available information shall be tailored to meet specific project needs. Reports that may be generated from data residing in CPTAS are listed in MSFC-MNL-1951.

10.0 CONFIGURATION VERIFICATION AND AUDITS

Verification of the hardware configuration assures that all requirements and engineering changes have been correctly translated into the hardware/software. Periodic verification is performed during design reviews when the progressive project baseline is established. On-going practices must also be established to ensure continuous verification. Tools used to achieve this continuous verification are the release system; accounting system; manufacturing practices; and inspection, audit, and surveillance practices.

10.1 REVIEWS AND INSPECTIONS

All MSFC Pressurized Carriers Projects shall establish, conduct, and support design/integration reviews and configuration inspections in accordance with NPG 7120.5, MIL-STD-1521, SSP 41170, or MIL-STD-498 for software. Reviews described may be held for the total project or for specific CI's. Additional reviews may include software specific reviews and orbiter cargo element integration reviews as detailed in the following subparagraphs:

10.1.1 SOFTWARE REVIEWS

A separate Software Specification Review (SSR) may meet the basic objectives of a PDR for software. The SSR will determine that the software requirements specification, interface requirements, and operational concept form a satisfactory basis for proceeding into preliminary software design. A software Test Readiness Review may be conducted to verify that software is ready for testing and test procedures are complete. Reference MIL-STD-498 for software review requirements.

10.1.2 ORBITER CARGO ELEMENT/INTEGRATION REVIEWS

Orbiter cargo element/integration reviews will be conducted as detailed in project cargo element integration control documents (Such as ICD-B-21309 for flight 6A).

10.2 CONFIGURATION AUDITS

Functional Configuration Audits and Physical Configuration Audits will be performed per the requirements of MWI 8040.6.

10.3 CONFIGURATION MANAGEMENT AUDITS

The CMO shall initiate and chair configuration management audits of in-house and contractor CM activities and records as necessary to verify the adequacy of configuration management

procedures and the implementation of the requirements of this plan. Contractor and in-house CM Audits shall be performed according to the principles of MWI 8040.7.

11.0 CONTRACTOR/VENDER CONTROL

Control of contractor/vendor CM shall as specified in the contract.

The PCI Contractor, Boeing/McDonnell Douglas Aerospace-Huntsville (Boeing/MDA-HSV), will provide CM support as specified in this CM Plan, as authorized by the contract and G6817E or PCI update.

11.1 CHANGE CLASSIFICATION FOR CONTRACTED ITEMS

Contractor initiated changes will be classified as either Class Class II or I. Class I changes are as defined in MIL-STD 973 and per the following criteria unless modified by a project addendum or by contractual direction:

11.1.1 CLASS I CHANGES

A change to procured items shall be classified as Class I when any baseline documentation is affected. Class I criteria include the following:

a) Configuration of qualified engineering critical components.
b) Configuration to the extent that modification action is required for EI'S.
c) Approved test and checkout requirements.
d) Documentation that is part of the product baseline (final acceptance of hardware/software).

11.1.2 CLASS II CHANGES

A proposed engineering change shall be designated as Class II when it does not fall within the Class I definition.

12.0 RECORDS RETENTION

See Table I. See also the Project Appendices for any project peculiar records retention requirements.

Table I: Pressurized Carriers Configuration Documentation Approval/Release Matrix

Document Type	Designer/Draftsman or OPR Designee	Materials	Stress	Quality Assurance (Inspectability)	Manufacturing (Producibility)	Drawing Checking (Note 5)	S&MA	Project Systems Engineer/ Release Authorization	Pressurized Carriers CCB Directive
CI Specifications/Standards	X	*	*	*	*	X	X	X	X
Documents	X	*	*	*	*	X	*	X	X
Interface Control Documents	X	*	*	*	*	X	X	X	X
Deviation/Waiver	X	*	*	X	*	*	X	X	X
New Drawing	X	X	X	X	X	X	*	X	X
Drawing Revision	X	X	X	X	X	X	*	X	X
EO/EPL	X	X	X	X	X	X	*	X	X
Floor EO/EPL	X	*	*	*	X	*	*	X	x

*As Required - signature requirement is determined by the Designer/OPR or Release Authorization.

NOTES:

(1) The matrix describes the minimum technical and project approvals required for configuration documentation prior to release. This matrix applies to Flight, Qualification, and Ground Support Equipment (GSE) configuration documentation, and any other configuration documentation that is CCB approved and released.

(2) The Project Systems Engineer is responsible for acting as Release Authority and ensuring that the appropriate technical approvals are included in the change package. The Project Systems Engineer determines the necessity for additional signatures. The Project Manager is the alternate for the Project Systems Engineer responsibilities above.

(3) The Project CCB Secretariat checks to assure that the Project Systems Engineer has signed as the technical Release Authority as specified in Item 2 above. The CCB Secretariat prepares a CCB Directive which is approved by the CCB Chairperson/Project Manager.

(4) For specifications, standards, and documents, the approvals will be recorded on the document signature page. For Deviation/Waivers, approvals will be recorded on the CCB Directive. For Drawings, EO'S, and EPL'S, the approvals will be recorded in the approval blocks provided on the forms.

(5) Drawing Checking approval is only required for configuration documentation that is released through the MSFC Release Desk.

TABLE II. QUALITY RECORDS

Record	Responsi-bility	Location	Authority	Retention/ Disposition	Maintenance
PCN Files	CMO	Building 4487	NPG 1441.1	3 years after program completion	Hardcopy/ sequentially by PCN number and chronologically with PCN
RID Files	CMO	Filemaker Pro Data File unless specified by project	NPG 1441.1	3 years after program completion	Electronic data file per review or as specified by project
Drawings, Documents	Repository	Building 4481	NPG 1441.1	3 years after program completion	Hardcopy
CM Audit Findings/ Closures	CMO	Building 4487	NPG 1441.1	3 years after program completion	Hardcopy/ sequentially by finding number per review
CCB Minutes	CMO	Contractor Support PC	NPG 1441.1	3 years after program completion	Hardcopy/ chronologically per CCB in notebook - Electronic/PC harddrive (Word)
CCB Action Files/Logs	CMO	Contractor Support PC	NPG 1441.1	3 years after program completion	Hardcopy/ chronologically per CCB in notebook - Electronic/PC harddrive (Excel)
CM Database Data	CMO	Contractor Support PC	NPG 1441.1	3 years after program completion	Hardcopy/notebook - Electronic/MSFC institutional database (CPTAS) or PC hard drive (Excel)

MARSHALL SPACE FLIGHT CENTER
CONFIGURATION CONTROL BOARD DIRECTIVE (CCBD)

1. CCBD NUMBER:	2. CONFIGURATION CONTROL BOARD:	3. DATE:
MP3-00-0039	MPLM LEVEL 111 CCB	03/19/2003
4. CHANGE NUMBER: FD24-0017		5. PAGE 1 OF 2
6. PROGRAM CONTROL NUMBER: MP00037	7. RESPONSIBLE INDIVIDUAL(S) ORGANIZATION(S): Allen Shariett/FD24 (256)544-7236	

8. CHANGE TITLE:	9. END ITEM NUMBER AND NOMENCLATURE:
Pressurized Carriers Group Configuration Management Plan Rev A	MPLM
10. EFFECTIVITY: MP01	11. BASELINE DOCUMENT AFFECTED: N/A

12. IMPACTS: _____

	YES	NO		YES	NO
Weight	☐	☒	Memory	☐	☒
Schedule	☐	☒	Cost per Flight	☐	☒
Power	☐	☒	Environmental	☐	☒

13. IMPACT COST:

FY- _____ COST: _____ FY- _____ COST: _____
FY- _____ COST: _____ FY- _____ COST: _____
FY- _____ COST: _____ TOTAL COST: _____ N/A

14. CHANGE DISPOSITION:

1.ECR FD24-0017 is approved as written.

2.Document , Pressurized Carriers Group Configuration Management Plan Rev A Dated February 24, 2003, is Hereby baselined.

3.Bessie Lee/PWI shall provied a copy of this document to the MSFC Documentation Repository for file and distribution per the Pressurized Carriers Group Distribution List.

4.All future changes to this Document shall require an ECR.

5.Debbie McWorthor shall put Pressurized Carriers Group Configuration Management Plan Rev A on the MPLM web sight.

EXPORT ADMINISTRATION
REGULATIONS (EAR) CONTROLLED DATA

15. CCB MEMBERS	CONCUR YES	CONCUR NO	CCB MEMBERS	CONCUR YES	CONCUR NO	16. CCB CHAIRPERSON
				X		Bessie Lee/PWI CCB Secretariat
C.Allen Shaiertt/FD24	X					
Shawn Reagan/FD24	X					
Shawn E. Reagan						
				X		Randy McClendon/FD24 Chairman,Pressurized Carriers, MPLM CCB 18 Mar 03
Michelle Butler/FD11						
Michelle Butler	X					

MSFC Form 2312 (Rev. September 1999)

Informed

1. NUMBER:	2. PCN:	**MSFC ENGINEERING CHANGE REQUEST (ECR)** (See Instructions: MSFC Form 2327-2)	3. DATE:	4. PAGE:
FD24-0017	MP00037		03/19/2003	1 OF 1

5. TO:	6. THRU:	7. FROM:
FD24/RANDY MCCLENDON		FD24/Bessie Lee

8. TITLE OF CHANGE:

Baseline Pressurized Carriers Group Configuration Management Plan Rev A

9. RECOMMENDED PRIORITY:	10. NEED DATE:
☐ EMERGENCY ☐ URGENT ☒ ROUTINE	03/20/2003
11. PROGRAM(S)/PROJECT(S) AFFECTED:	12. CONFIGURATION ITEM(S) AFFECTED BY NOMENCLATURE:
ISS MPLM	MPLM
13. RECOMMENDED EFFECTIVITY(IES):	14. DOCUMENTATION AFFECTED (Specs, ICD, etc.):
MP01	N/A
15. RELATED CHANGES (ECR, ECP, CR, etc.) BY NUMBER: N/A	15A. INITIATING DOCUMENT NUMBER (e.g., DR, Software Trouble Report, etc.):

16. JUSTIFICATION FOR CHANGE (Include effect if not incorporated. If necessary, continue on MSFC Form 2327-1, Continuation Sheet):

Add Signature Matrix and editorial changes.

17. EFFECTS ON:

☐ HARDWARE ☐ FACILITY ☐ SCHEDULE (SEE ENCLOSURE _____ FOR IMPACT ☒ REQUIREMENTS DOCUMENTATION

☐ SOFTWARE ☐ ENVIRONMENT ☐ COST (ESTIMATED COST INCLUDED IN ENCLOSURE _____) ☐ OTHER (SPECIFY): _____

18. DESCRIPTON OF CHANGE (Include reference to enclosure. If necessary, continue on MSFC Form 2327-1, Continuation Sheet.):

EXPORT ADMINISTRATION REGULATIONS (EAR) CONTROLLED DATA

Baseline Pressurized Carriers Group Configuration Management Plan Rev A

19. MOD KIT INFORMATION:

YES	NO		Enclosure	Paragraph
☐	■	Previously issued modification instructions affected? (Explain)		
☐	■	Proofing of modification instructions and kit installation required? (Explain)		
		Proofing location:		
☐	■	Retest required? (Identify test invalidated by change)		
☐	■	Requalification required? (Include description of test plan for requalification)		

Vehicle/Site & CI Serial No.	Change Period	Mod Kit Delivery Date	Est. M/H for Mod Kit Instl.	Out-of-Service Time

20. SIGNATURE OF ORIGINATOR:	DATE:	TELEPHONE NUMBER:	OFFICE SYMBOL:
Bessie Lee	3/20/03	(256) 544-7109	FD24

21. **CONCURRENCE**

SIGNATURE	ORG. CODE	DATE	SIGNATURE	ORIG. CODE	DATE

22. **TECHNICAL APPROVAL**

SIGNATURE	ORG. CODE	DATE	SIGNATURE	ORIG. CODE	DATE

PACKAGE NUMBER: 9984R	DOCUMENTATION PACKAGE / ROUTING SLIP	SHEET 1 OF 1

PROGRAM/PROJECT:
Pressurized Carriers/MPLM

CEI NUMBER:	NOMENCLATURE: FD24-CM01 Rev A
ECR NUMBER: FD24-0017	CCBD NUMBER: MP3-00-0039
PCN NUMBER: MP00037	DATE PREPARED: 02/19/2003

DRAWING / DOCUMENT NUMBER	DRL / EPL NUMBER	EO NUMBER

SUBMITTED BY ENGINEERING AREA:	BASIC RELEASE ☐ ; PARTIAL ☐ COMPLETE ☒
	CHANGE RELEASE ☐ ; PARTIAL ☐ COMPLETE ☐

THIS SUBMITTAL CLOSES ACTION ON ABOVE CCBD BY: ☒ YES ☐ NO

PREPARED BY: Bessie Lee/PWI/FD24 Bessie Lee	DATE: 02/19/2003	TRANSMITTAL DATES
SUBMITTED BY: Bessie Lee/PWI/FD24 Bessie Lee	DATE: 02/19/2003	TO RELEASE:
CONCURRENCE: Johnny Robinson/PWI/FD23 Johny F Robinson	DATE: 02/19/2003	TO MSFC REPOSITORY:

REMARKS:

MSFC DOCUMENTATION REPOSITORY - DOCUMENT INPUT RECORD

I. GENERAL INFORMATION

1. APPROVED PROJECT:	2. DOCUMENT/ DRAWING NUMBER:	3. CONTROL NUMBER:	4. RELEASE DATE:	5. SUBMITTAL DATE:
PressurizedCarriers Group/MPLM	FD24-CMO1 REV.A	MP00037	02/19/2003	3-20-03

6. DOCUMENT/DRAWING TITLE:	7. REPORT TYPE:
Baseline Pressurized Carriers Group Configuration Plan Rev. A	Plan

8. CONTRACT NUMBER / PERFORMING ACTIVITY:	9. DRD NUMBER:	10. DPD / DRL / IDRD NUMBER:
477-72-61	NA	NA

11. DISPOSITION AUTHORITY (Check One):	12. SUBMITTAL AUTHORITY:	13. RELEASING AUTHORITY:
☒ Official Record - NRRS 8/5/A/1 (c) ☐ Reference Copy - NRRS 8/5/A/3 (destroy when no longer needed)	Allen Shariett/FD24	MPLM LEVEL III CCB

14. SPECIAL INSTRUCTIONS:
Index, File and distrubute per list attached for Baseline Pressurized Carriers Group (PC) Multi Pourpose Logistics Module (MPLM)

15. CONTRACTOR/SUBMITTING ORGANIZATION, ADDRESS AND PHONE NUMBER:	16. ORIGINATING NASA CENTER:
MSFC	MSFC
	17. OFFICE OF PRIMARY RESPONSIBILITY: Allen Shariett/ FD24

18. PROGRAMMATIC CODE (5 DIGITS): 477-72-61	19. NUMBER OF PAGES: 27

II. ENGINEERING DRAWINGS

20. REVISION:	21. ENGINEERING ORDER:	22. PARTS LIST:	23. CCBD:
Revision ~~A~~	~~NA~~	~~N/A~~	MP3-00-0039

III. REPORTS, SPECIFICATIONS, ETC.

24. REVISION:	25. CHANGE:	26. VOLUME:	27. BOOK:	28. PART:	29. SECTION:
A					

30. ISSUE:	31. ANNEX:	32. SCN:	33. DCN:	34. AMENDMENT:

35. APPENDIX:	36. ADDENDUM:	37. CCBD:	38. CODE ID:	39. IRN:
		MP3-00-0039		

IV. EXPORT AND DISTRIBUTION RESTRICTIONS

- ☐ Privacy Act (see MWI 1382.1)
- ☐ Proprietary (see MPD 2210.1)
- ☐ Patent (see MPG 2220.1)
- ☐ ITAR (see MPG 2220.1)
- ☒ EAR (see MPG 2220.1)
- ☐ Other ACI (see NPG 1620.1 and MPG 1600.1) _____
- ☐ No statutory or institutional restrictions applicable -- material may be electronically distributed to user in the NASA domain

V. ORIGINATING ORGANIZATION APPROVAL

40. ORG. CODE:	41. PHONE NUMBER:	42. NAME:	43. SIGNATURE/DATE:
FD24	(256) 544-3559	Randy K.McCLENDON	Randy K McClendon 18 Mar 03

VI. TO BE COMPLETED BY MSFC DOCUMENTATION REPOSITORY

44. RECEIVED BY:	45. DATE RECEIVED:	46. WORK ORDER:
	3/20/03	02-00364-3