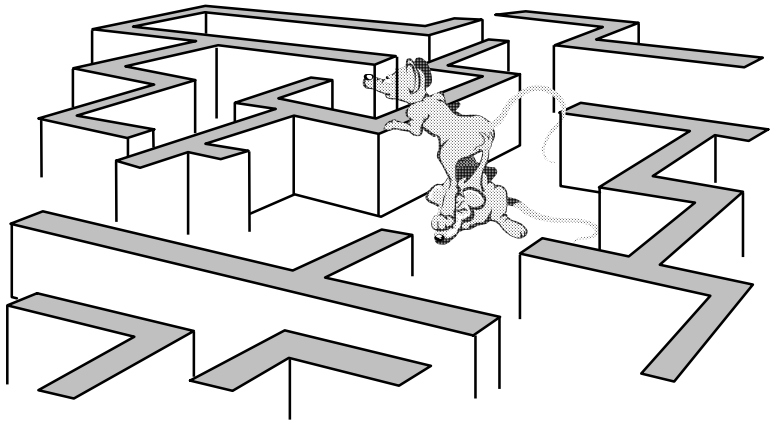

# CONFIGURATION MANAGEMENT

## ECS Release 4 Training

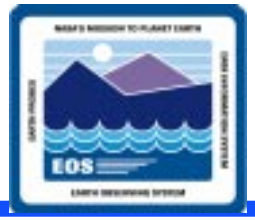
625-CD-012-002

# Overview of Lesson

- **Introduction**
- **Configuration Management Topics**
  - **M&O role in CM activities**
  - **Configuration Control Boards (CCBs)**
  - **Configuration Change Request (CCR) Process**
  - **Software Change Process**
  - **Hardware Change Process**
  - **Baseline Change Process**
- **Practical Exercise**



# Objectives




- **Overall: Proficiency in ECS Configuration Management**
  - **Describe M&O role in CM activities**
  - **List Configuration Control Boards (CCBs), roles, and responsibilities**
  - **Process a Configuration Change Request (CCR)**
  - **Prepare a request for impact analysis**
  - **Process a software change** ***Not currently applicable***
  - **Process a hardware change**
  - **Process a baseline change**

# Importance

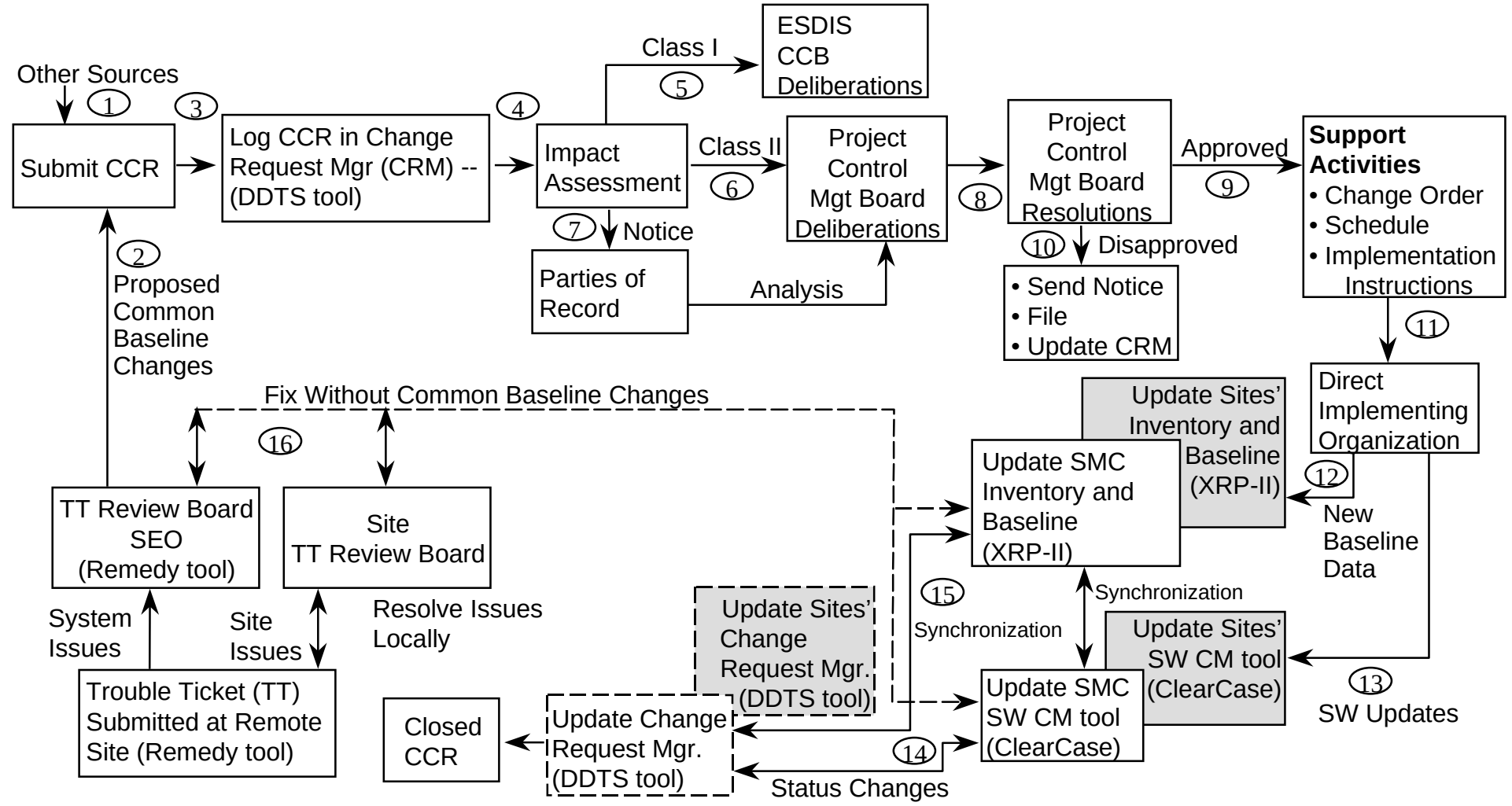
**Lesson provides preparation for several roles to ensure effective CM for implementation of system changes**

- **CM Administrators**
- **System Engineers, System Test Engineers, Maintenance Engineers**

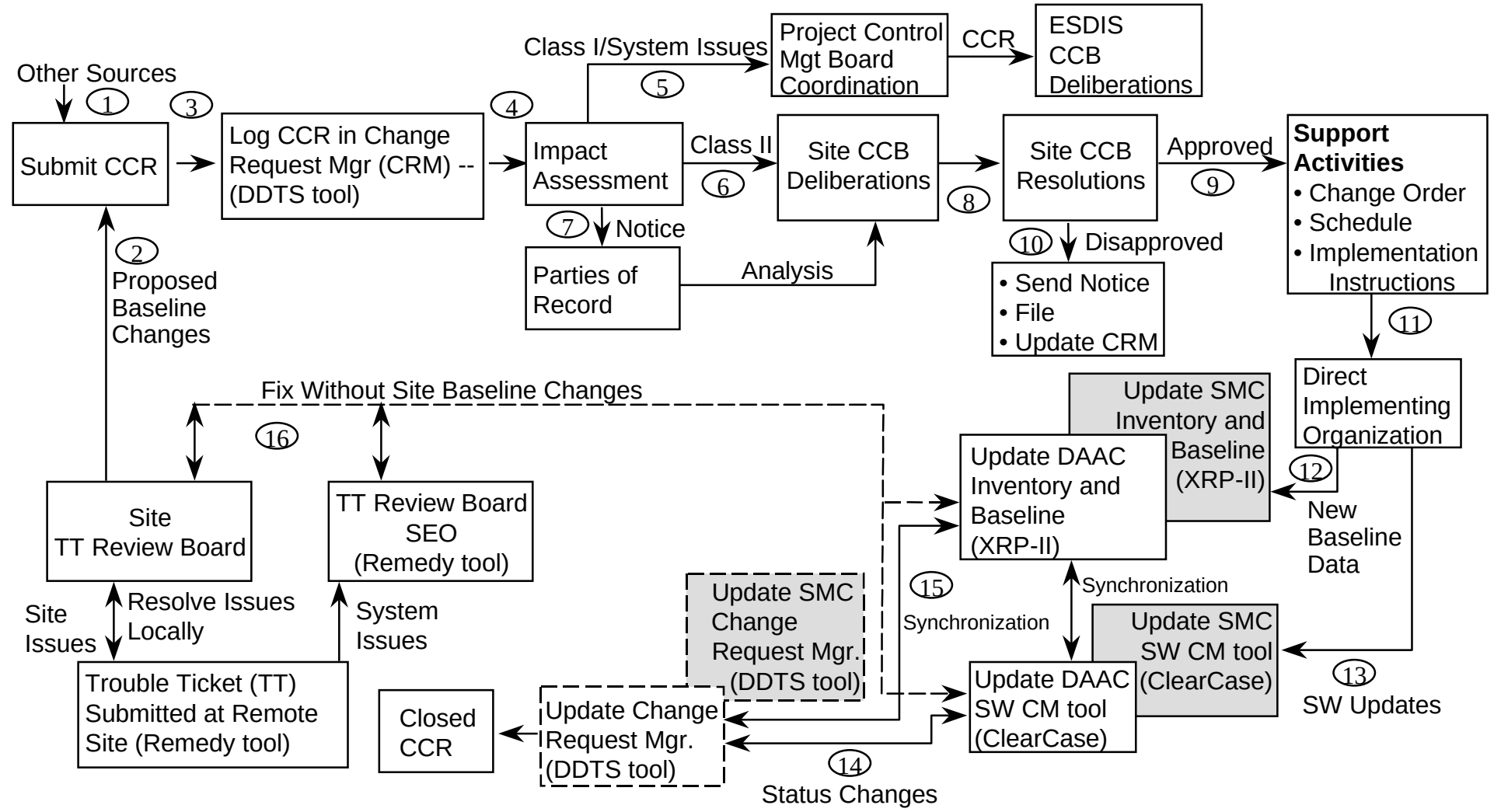
# M&O Role and CM Activities

- **Maintenance and Operations CM activities**
  - **After acceptance of ECS**
  - **Administrative and technical support of change control**
  - **Documentation and coordination of changes to site hardware, software, and procedures**
  - **Configuration identification**
    - **Maintenance and control of technical documentation**
  - **Configuration status accounting**
    - **Recording and reporting information about the configuration status of ECS documentation, hardware, and software**
    - **XRP-II**
  - **Configuration audits**
    - **M&O supports internal and ESDIS assessments of project compliance with relevant CM plans**

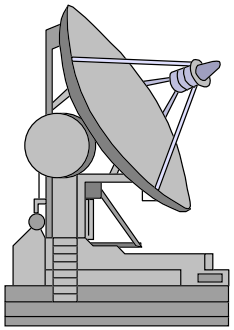
# Change Control - SEO Level



# Change Control - Site Level

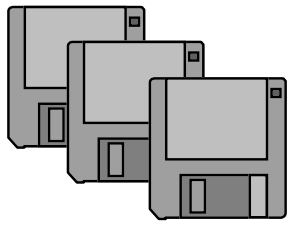


# M&O Role and CM (Cont.)

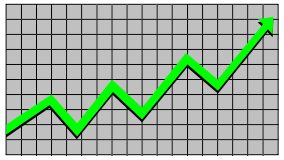


- **Science Software CM**
  - **SSI & T: DAAC management and I &T team**
  - **M&O support during I & T**
  - **support DAAC Manager after acceptance**
- **SEO -- Liaison between sites and ESDIS CCB**
  - **maintenance of on-site software library**
  - **M&O ensures coordination and availability of needed data**

# Maintenance of the M&O Libraries



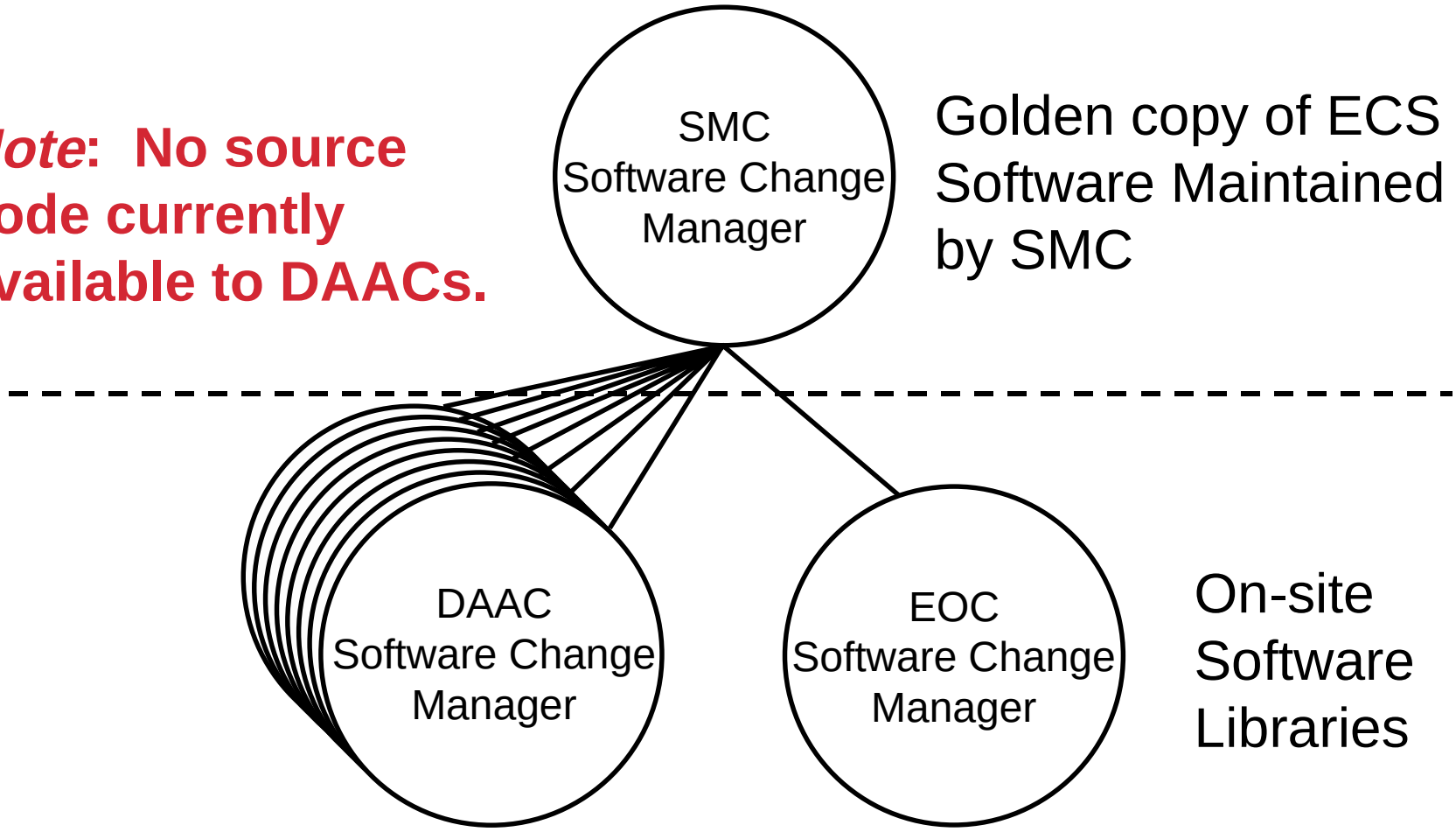
- **Maintenance of M&O Documentation and Software Library**
  - **both common and site-specific software**
  - **site personnel responsible for CM associated with library**
- **Library supported and controlled by ClearCase™**
  - **manages sharing and control of source, object, and executable files**
  - **tracks software build process**



  - **automates enforcement of operational policies and procedures**
  - **tracks source elements and documentation, providing record of configuration items, their attributes, and a change history for each item**

# Change Control and Software Libraries

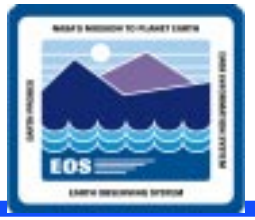
***Note*: No source code currently available to DAACs.**



# Library Administration

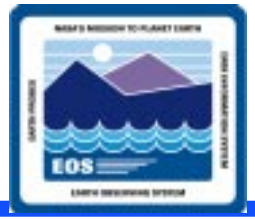
- **Soft or hard copy maintained in library**
- **Document support directories**
  - CUSTOM/docs:  file descriptive materials
  - CUSTOM/docserver:  document repository
- **Microsoft Access database for library holdings and index**
- **Baseline Manager tool for documents that are under baseline CM control**

# M&O Role and CM (Cont.)




- **Baseline control milestones during maintenance and operations**
  - **Installation Plan (IP): COTS hardware configuration**
  - **Consent to Ship Review (CSR): hardware and software configuration and plans for host sites**
  - **Release Readiness Review (RRR): documents state of configuration items at each host site**
  - **Operational Readiness Review (ORR): documents flight-certified, ESDIS-approved, fully integrated EGS**
- **Site authority**
  - **ESDIS - authority over changes to common software**
  - **site CCB - authority over site-specific Class II changes**
  - **site-specific parameters for COTS software**
  - **specific configuration of tools and utilities, as delegated by ESDIS**

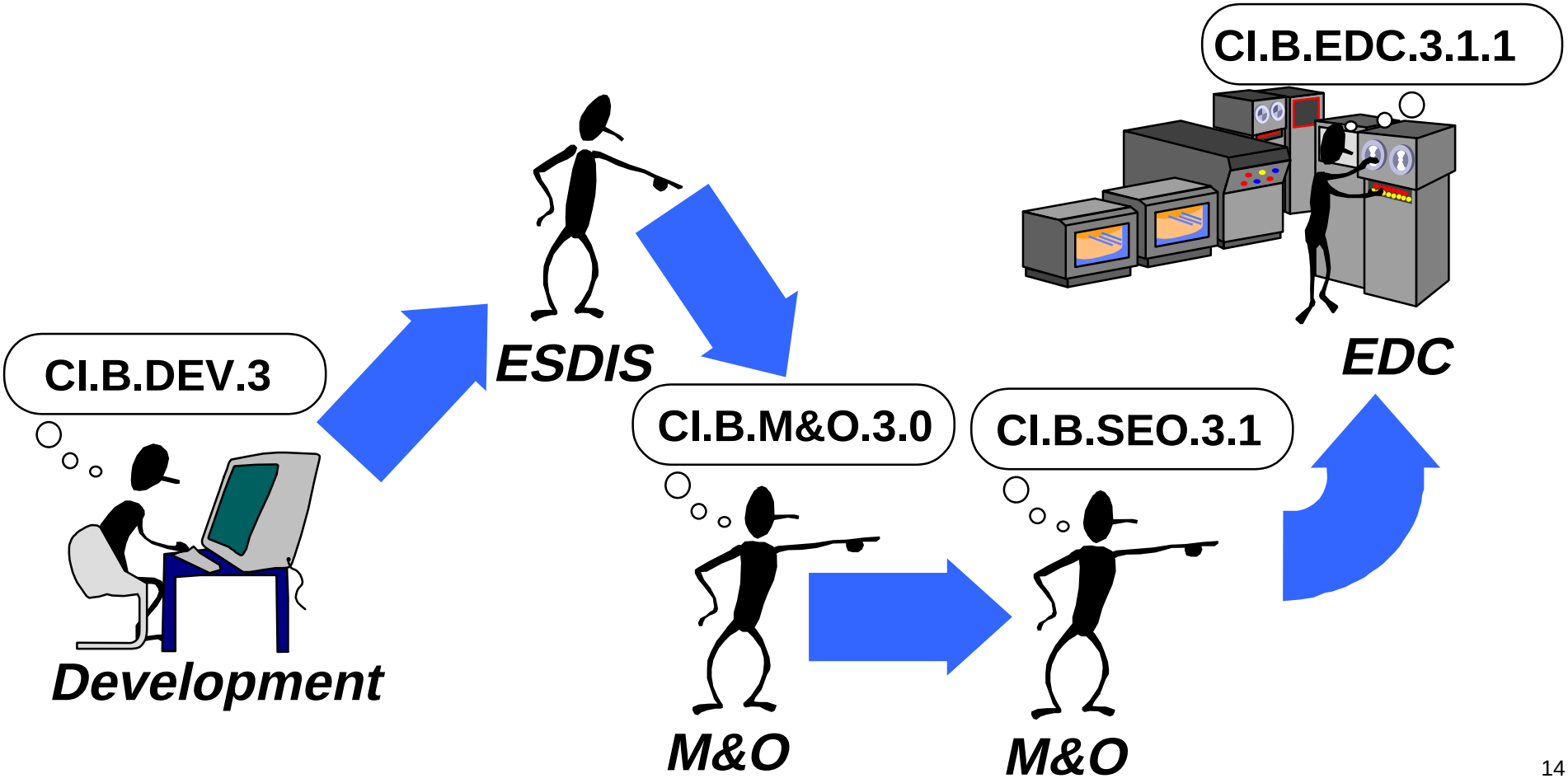
# Configuration Identification



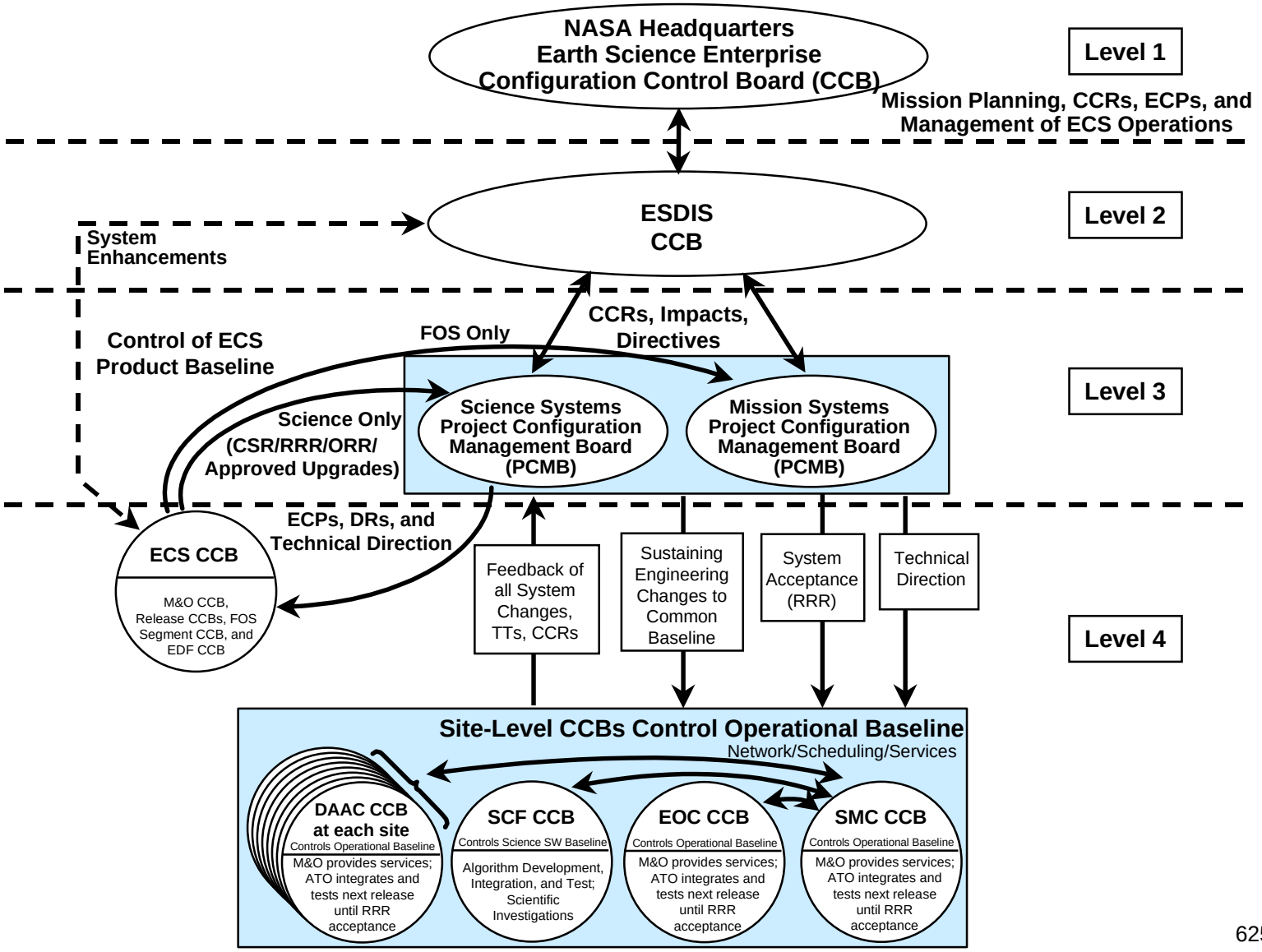

- **Establishes unique identifiers for ECS control items: Hardware, Software, Databases, Documentation**
- **Developer Guideline References**
  - **ESDIS CM Plan**
  - **MO&DSD CM Plan**
  - **ECS M&O CM Plan**
  - **Software Build Process Project Instruction**
  - **Software Naming Conventions Project Instruction**
  - **Directory and File Name Guidelines and Standards for ECS**
  - **Document Numbering, DM-1_002**
  - **DoD MIL-STD-973**

# Configuration Identification (Cont.)

- **Standard format for ECS extended configuration identification:** Control Item.Release.Organization.#_Dev.#_M&O.#_Center



# CCB Hierarchy



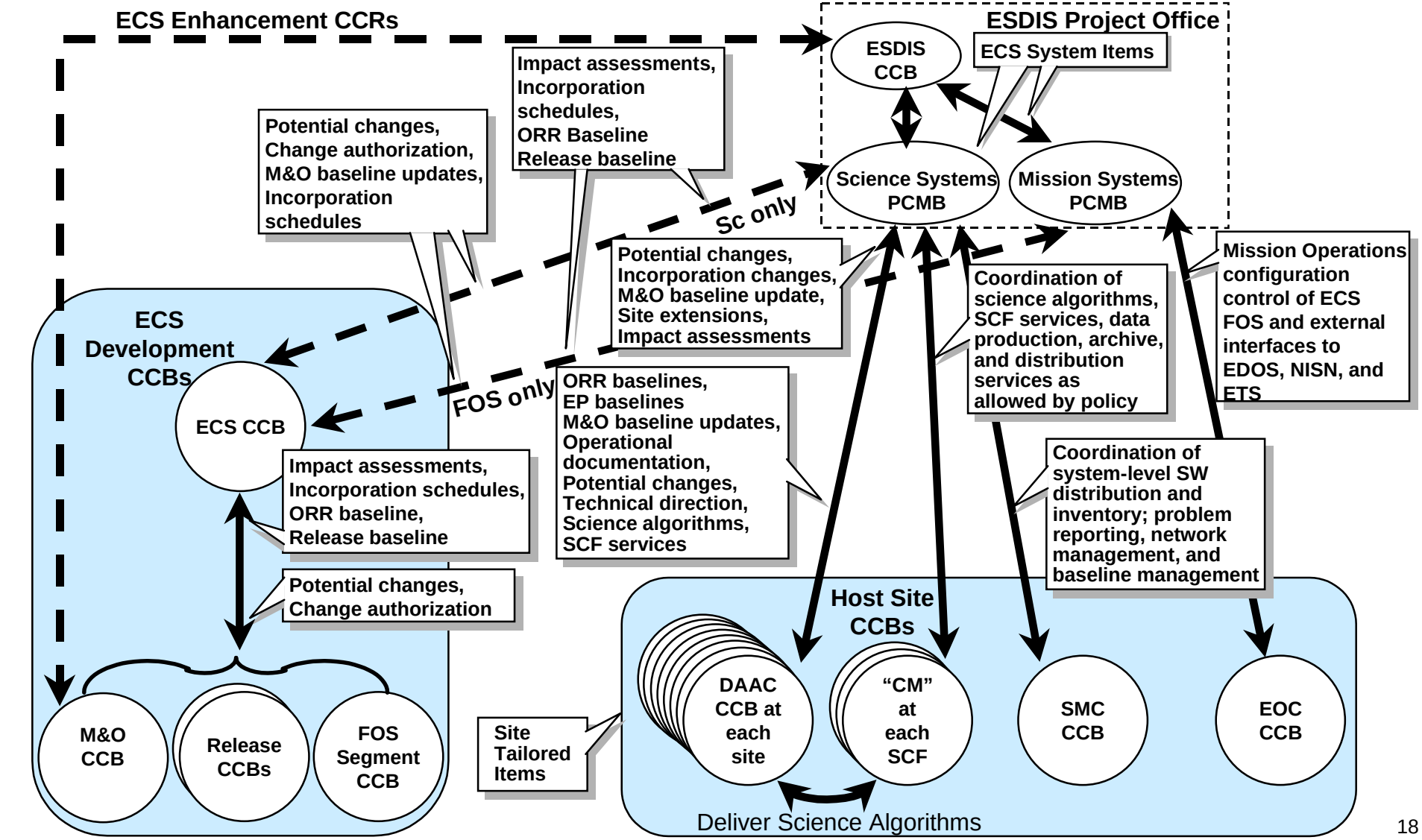
# CM Responsibilities

- **ESDIS Management**
  - **establishes ECS CM policies**
- **CCBs**
  - **classify, prioritize, evaluate, recommend, and approve (within their authority) changes to baselines**
- **CM Administrators (at SMC, EOC, DAACs, SCFs)**
  - **establish and maintain CM records**
  - **facilitate the configuration change request (CCR) process**
  - **monitor and report status of proposed and approved CM actions**
  - **support their respective CCB (as required)**

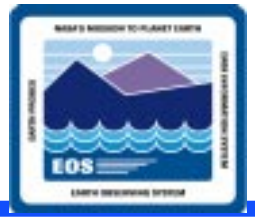
# CM Responsibilities (continued)

- **Sustaining Engineering Organization (SEO) --**
  - **assesses feasibility and cost, schedule and performance impacts of proposed system-wide changes**
  - **implements such changes when directed by ESDIS**
- **DAAC Sustaining Engineers --**
  - **assess DAAC impacts of system-wide proposed changes**
  - **develop and maintain ESDIS-approved DAAC-specific modifications to ECS products**
- **Maintenance Engineers --**
  - **maintain ECS HW and report configuration changes resulting from maintenance actions**

# Operational CCB Relationships

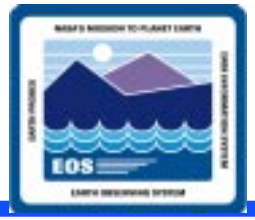


# Science Software and Change Control




- **Science Computing Facility (SCF) performs configuration control**
  - **Software and Databases to be executed at another site**
  - **SCF resources that are made available to EOSDIS community**
- **ECS M&O function directed by DAAC CCB**
  - **Accepts science software and data from the SCF**
  - **Provides services to support EOC control of the EOC operational baseline**
- **Central coordination by Project Control Management Board**
  - **ECS integrity and quality of service**
  - **Coordination with internal and external networks, systems, facilities**
  - **ESDIS CCB visibility into ECS operations**
  - **Convenient user administrative services**

# Configuration Change Requests (CCRs)




- **No undocumented changes**
  - **all requests for change documented using CCR form**
  - **CCR generated against the baseline affected by the proposed change**
  - **Form can be completed electronically**
    - **Word processing form**
    - **Change Request Manager tool (CM Administrator)**
- **CCB review**
  - **CCR submitted to appropriate CCB**
  - **CCR form may also be a cover sheet for a request to CCB for a deviation or waiver from baseline**

# ECS CCR Form

**Earth Observing System Data and Information System (EOSDIS)**
**Core System (ECS)**
**Configuration Change Request (CCR)**

**1. Configuration Change Board (CCB)**
ESDIS:___ ECS:___ SMC:___ DAAC: GSFC___, LaRC ___,
ASF___, EDC___, JPL___, NSIDC___, ORNL___ EOC:___

2. CCR No.

| 3. Submitted Date: | 4. Revision | 5. Priority<br>Emergency ☐<br>Urgent ☐<br>Routine ☐ | 6. Change Class | 7. Status |
|---|---|---|---|---|
| | | | | |

8. CCR Title:

9. Originator: Org: e-mail: phone:

10. Approval:_____ _____
signature date

11. Reason for Change
(indicate attachment ___)

12. Description of Change
(indicate attachment ___)

13. Impact Analysis:
Cost: ☐ None ☐ Small (Not exceeding $100,000) ☐ Medium ($100,000 to $500,000) ☐ Large (Over $500,000)
Evaluation Engineer: Org: e-mail: phone:
Impact Evaluators: ESDIS___; ECS Dev___; SEO___; SMC___; DAACs: GSFC___,
LaRC ___, ASF___, EDC___, JPL___, NSIDC___, ORNL___; EOC___;
Others_____ (indicate attachment ___)

14. Comments: (Indicate Sites/ Organizations Affected)
(indicate attachment ___)

15. Board Action: ☐ Approved ☐ Withdrawn ☐ Disapproved ☐ Deferred Until_____
date
Further Action Required: ☐ ECP ☐ Waiver ☐ Deviation ☐ Tech Direction ☐ Contract Mod
☐ DCN Other:_____

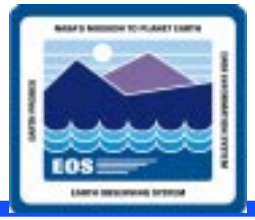
| 16. CCB Approval<br>Chair:_____ _____<br>signature date | 17. CCR Implemented<br>CM Admin. signature:_____ date:____ |
|---|---|

# Change Request Manager (DDTS)

# Request for Impact Analysis

- **Support of ESDIS CCB may require assessment of the impact of a proposed CCR on local or system maintenance and operations**
- **Assessing the impact of CCRs with significant system implications and/or potential system-wide application may require the assistance of the ECS development organization**
- **Formal request for impact assessment according to Mission Operation Procedures for the ECS Project (611-CD-004-004)**
- **Impact assessments consolidated into a CCR Impact Summary**

# CCR Impact Analysis Form




**CCR Impact Analysis**

**Responder Request Number:** ____
**Responder:**_____
Responder Point of Contract:
address:_____
_____
phone:_____
e-mail:_____
CCB Schedule Date:_____
**CCR Number:**_____
CCR Log Date:_____
**CCR Originator:**_____
CCR Originator Point of Contract:
address:_____
_____
phone:_____
e-mail:_____

**Evaluation Engineer:** _____
Evaluation Engineer Point of Contact:
address:_____
_____
phone:_____
e-mail:_____
Requested Return Date:_____

**Rough Order of Magnitude (ROM) Impact Analysis**

Basis of Estimate:

Technical Assumptions and Comments:

Cost Impact:
None [ ]
Small [ ] < $100,000
Medium [ ] $100,000 < x < $500,000
Large [ ] > $500,000

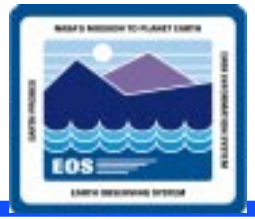
Schedule Impact:

**Technical Assessment:** ( Your impact analysis should consider the implementation approach; interfaces affected; HW or SW changes required; documentation changes required -- change from/to pages; suggested alternatives, if any; and impact to security features. If your system is not impacted, please provide that information to the CM Administrator. )

**Comments:**

Signed:_____
(Responder)
Date:_____

# CCR Impact Summary




**CCR Impact Summary**

**Evaluation Engineer:** _____
Evaluation Engineer Point of Contact:
address:_____
_____
phone:_____
e-mail:_____
CCR Board Date:_____

**Resources Summarized:**

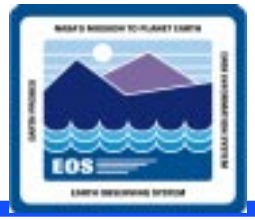
**Technical Summary:**

**ROM Summary (BOE, Cost, and Schedule):**

**Recommendation:**

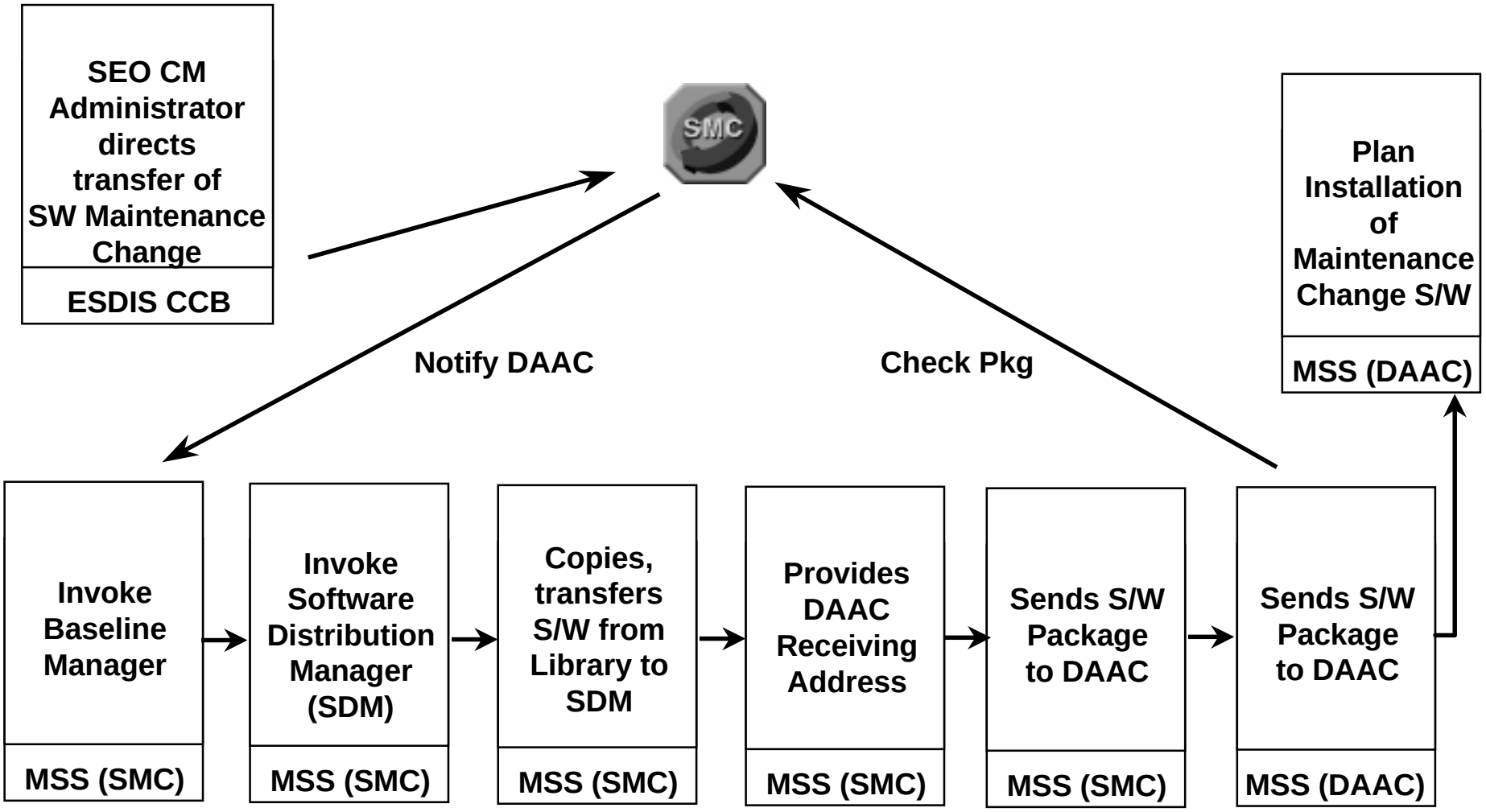
Signed:_____
(Evaluator)
Date:_____

# Software Baselines and Changes

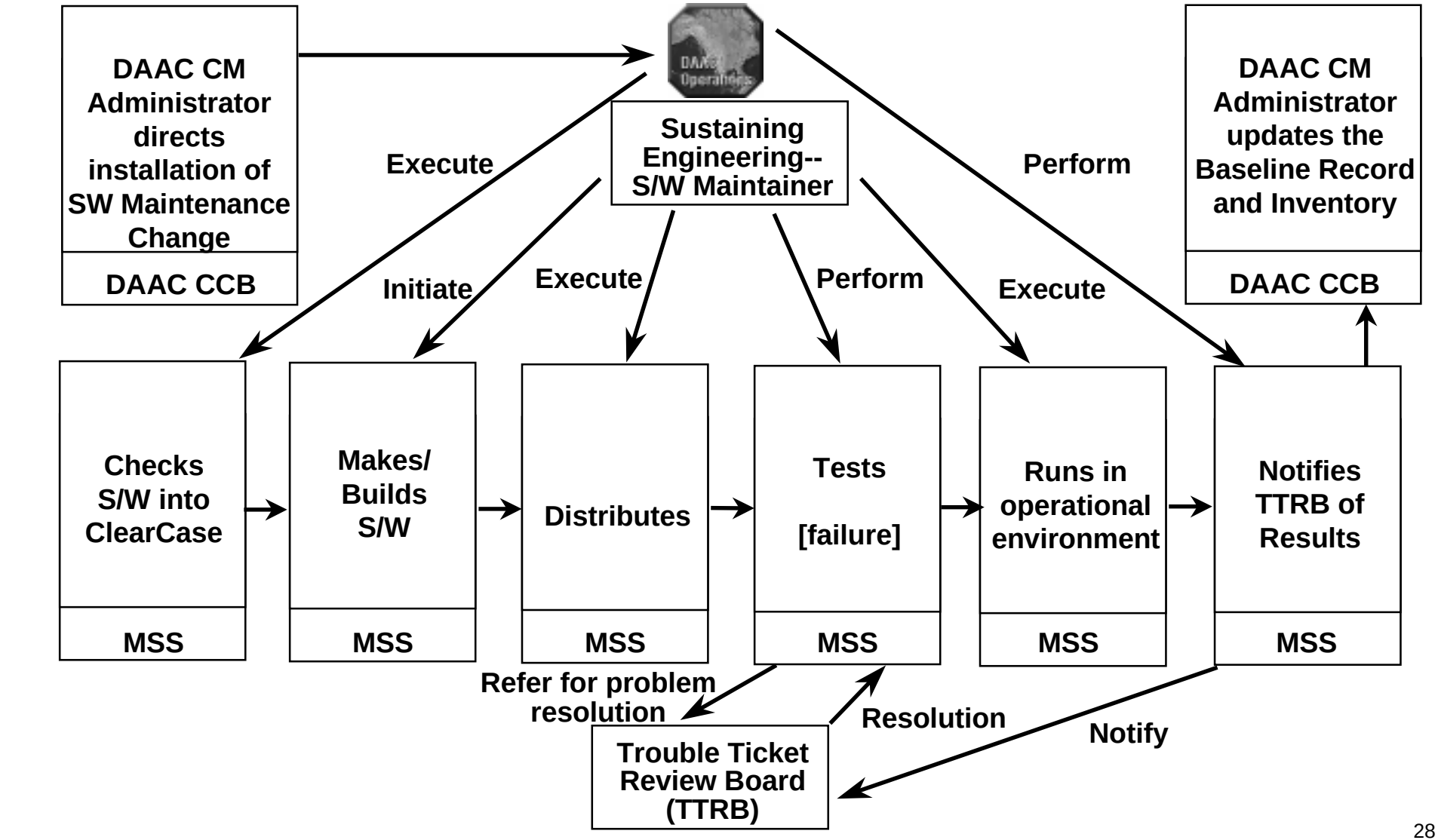



- **Software release is through ESDIS SMC or, with ESDIS permission, directly to the sites**
  - **Version Description Document (VDD) provides summary documentation package**
  - **ECS Project CMO assembles and packages the delivery**
- **Change Scenarios**
  - **COTS software problem**
  - **custom software problem**
  - **science software upgrade**
  - **COTS software upgrade**
  - **system enhancement**

# Software Transfer & Installation: Transfer Functional Flow



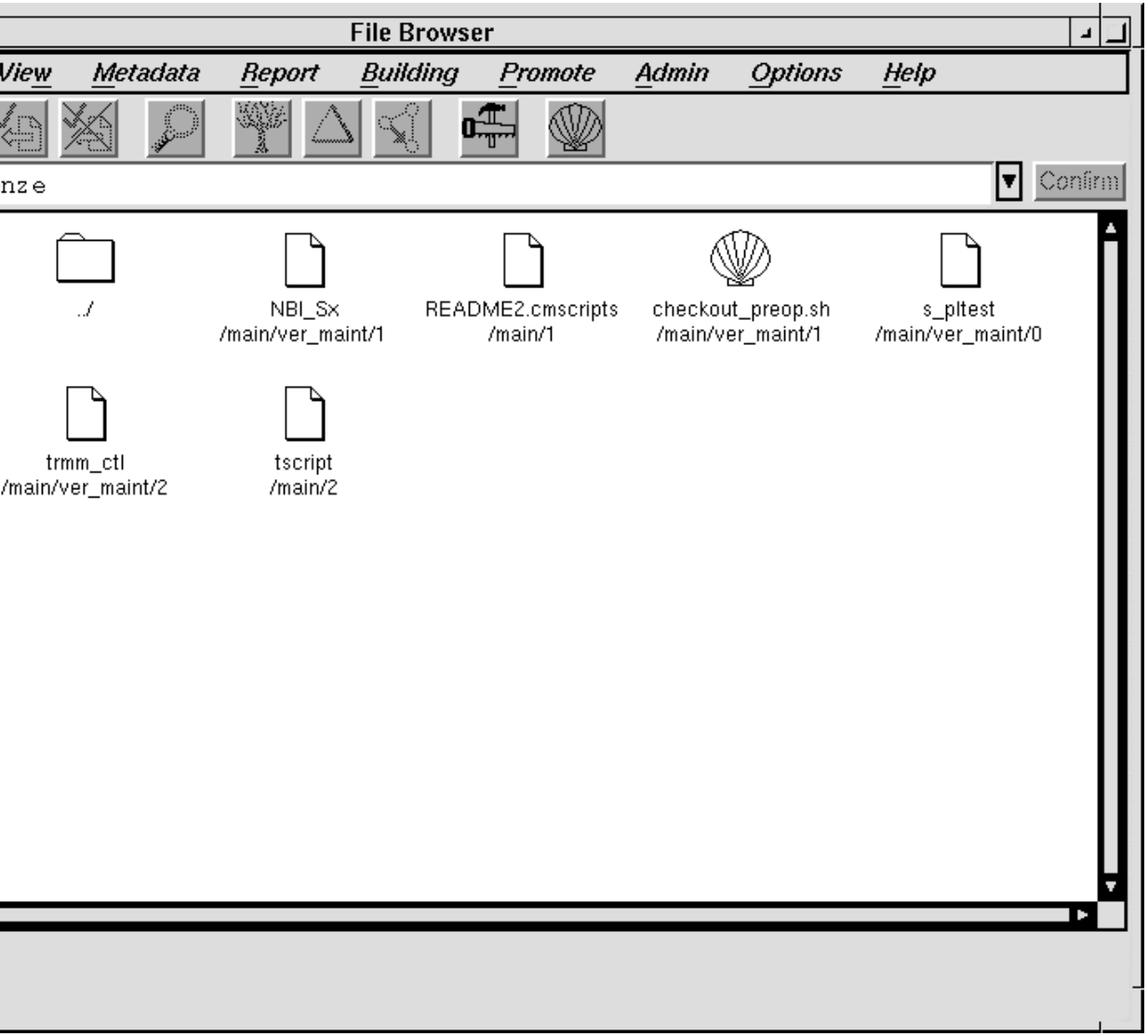
# Software Transfer & Installation: Installation Functional Flow



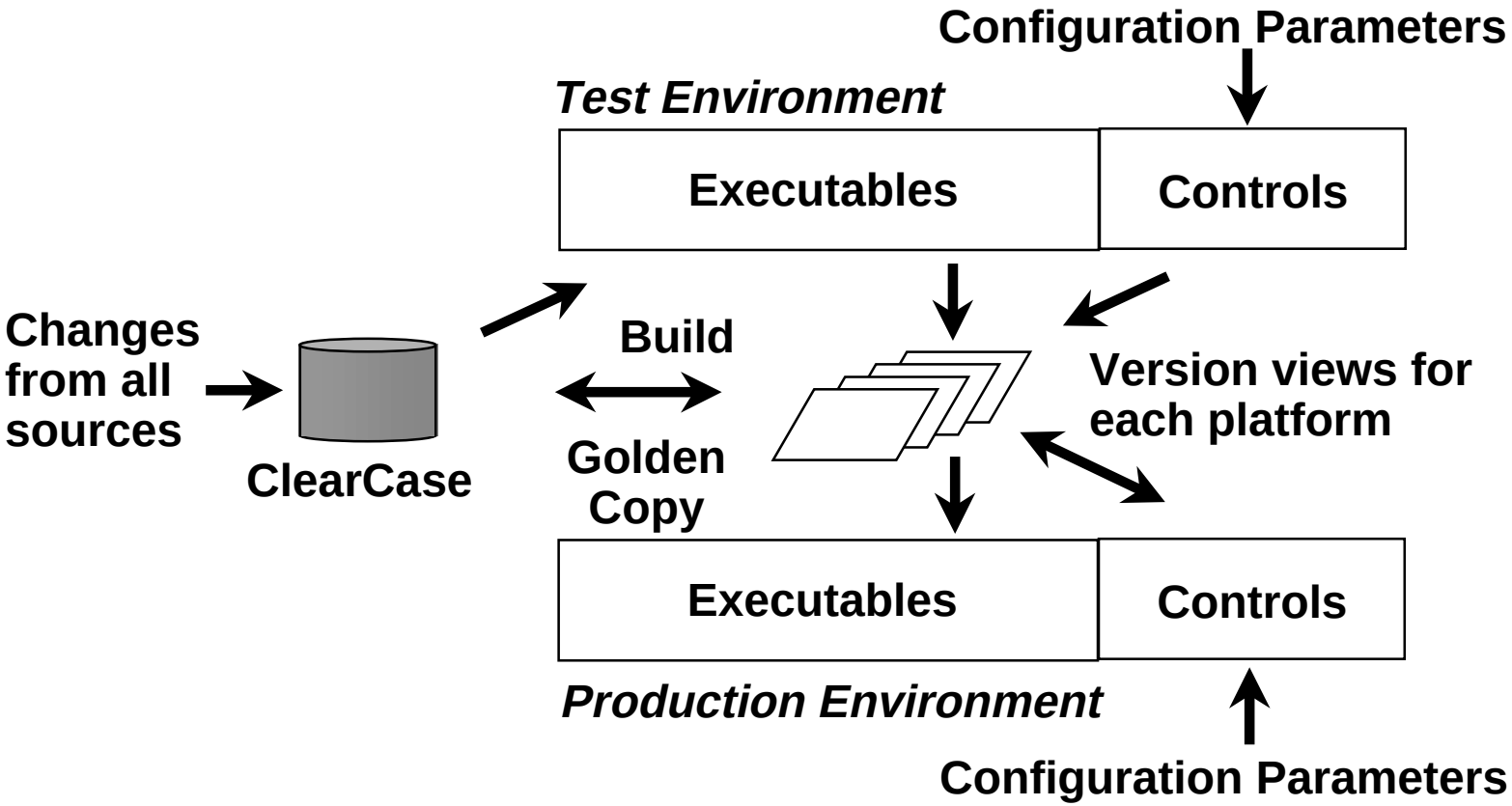
# Software Transfer

- **When software maintenance change package is ready and approved by ESDIS CCB, SEO CM Administrator requests distribution**
- **SMC CM Administrator promotes the change in ClearCase**
  - ***Change Promotion Level* is accessible as a choice on the *Promote* menu on the ClearCase main screen, called the File Browser**

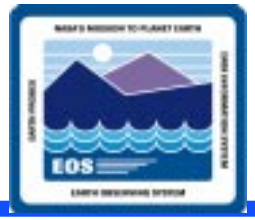
# ClearCase File Browser Screen (Main Screen)



# ClearCase™: Site Installation of SW



# Software Change Installation




- **Review/approval by ESDIS**
- **VDD final updates for system and center-specific material; final VDD is published**
- **Installation of the build and operational and user documentation IAW installation schedule**
  - **ClearCase™: Multiple versions of production software always retained**
  - **Scripts for System Administrator to do installation**
- **Controlled document updates provided to SEO Document Maintenance and entered into CM**
- **CM system updated to reflect M&O and center-specific baselines**

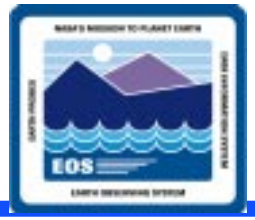
# Hardware Baselines and Changes

- **Hardware baseline established at Release Readiness Review (RRR) following formal Physical Configuration Audit (PCA) and Functional Configuration Audit (FCA)**
  - **ESDIS approves establishment of operations baseline**
  - **Configuration baseline recorded in Engineering Release Record**
  - **M&O conducts testing of builds to ensure proper implementation of CCRs with no defects introduced**
- **Change Scenarios**
  - **COTS hardware problem repair that requires a CCR**
  - **System enhancement**

# Hardware Change Installation

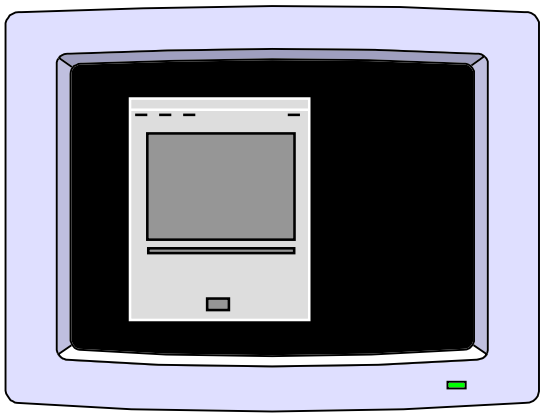
- **Repair with part of same make, model, version does *not* require CCR**
- **Change in make, model, version of a part to be used for repair, e.g., in an emergency, necessitates CCR to document the change**
  - **Review/approval by site CCB**
  - **Review by SEO/ESDIS for impacts/applicability to other sites**
  - **Provision of controlled document updates to SEO Document Maintenance and entry into CM**
  - **CM system updates to reflect change**

# Hardware Configuration Audits



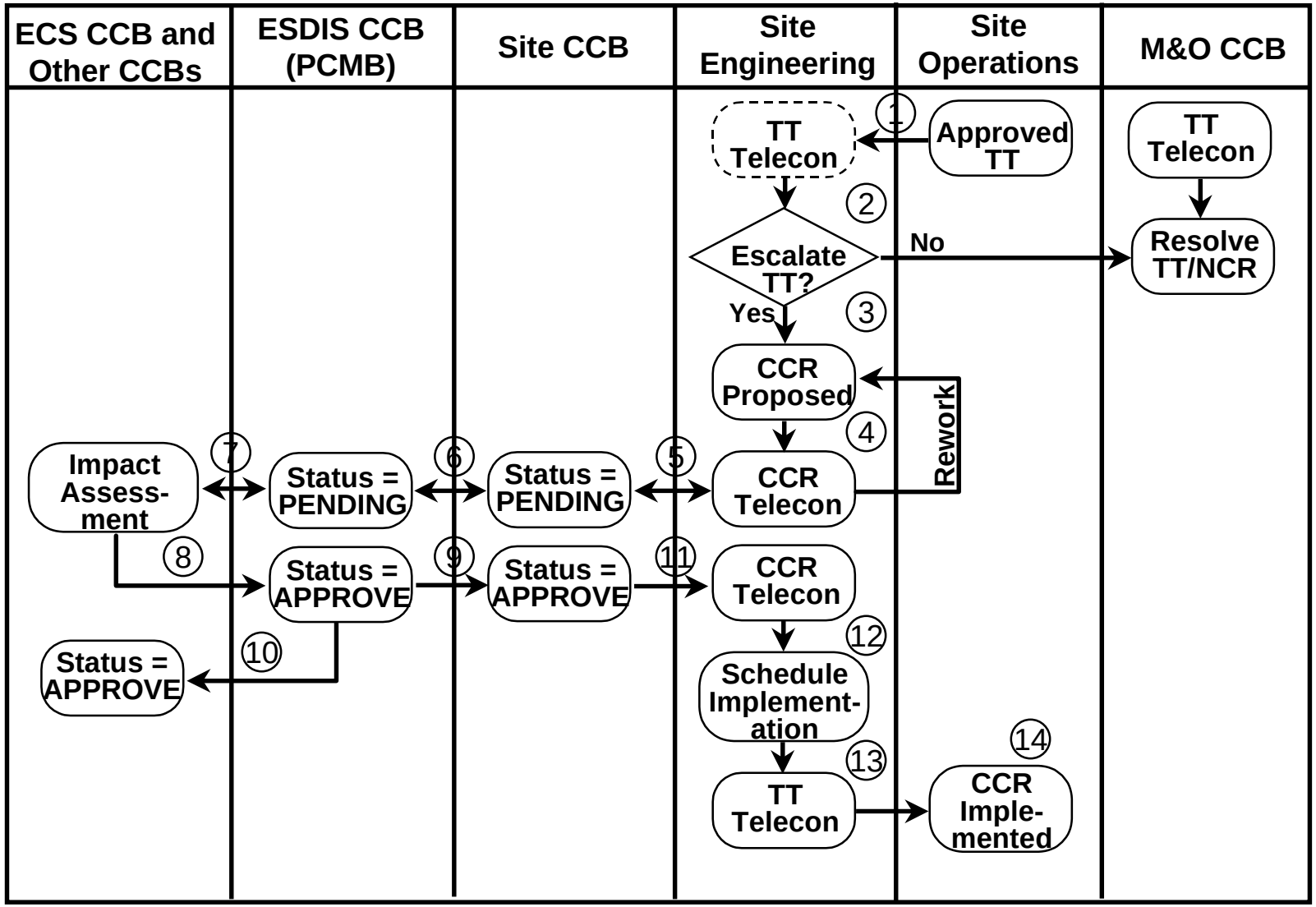

- SEO supports FCA/PCA by the Acceptance Testing Organization (ATO) at RRR
- SEO conducts internal audits
  - CM policies, procedures, and practices followed
  - Proper implementation of approved changes
  - As-built documentation reflects deployed configuration
- SEO supports ESDIS CM audits
  - As-built configuration reflects CI documentation
  - Test results verify performance
  - As-built configuration shipped reflects tested configuration
  - Untested requirements verified by interfacing documentation
  - COTS products audited as part of baseline

# Changes to the Baseline

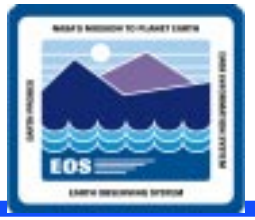


- **CM Tools for baseline changes**
  - **Change Request Manager: DDTS**
  - **Baseline Manager: XRP-II**
  - **Inventory/Logistical Manager: XRP-II**
- **Related tools**
  - **From Management Subfunction software**
    - **Trouble Ticket System (TTS)**
    - **Problem reporting and tracking**
    - **Used by users, operators, system administrators**

# CCR Approval Flow



# Baseline Terms and Concepts




- ***Baseline Management*** **is to identify and control baselined versions of hardware and software, and maintain a complete history of baseline changes**
- ***Control Item*** **is any ECS item under version control by CM**
- ***Configuration Item (CI)*** **is an aggregation of hardware, firmware, software, or any discrete component or portion, which satisfies an end user function and is designated for configuration control**
- ***Baseline*** **is a configuration identification document or set of such documents formally designated by the Government at a specific time in the life cycle of a CI**
- ***Configured Article*** **is a control item reportable as part of the Configured Articles List (CAL)**

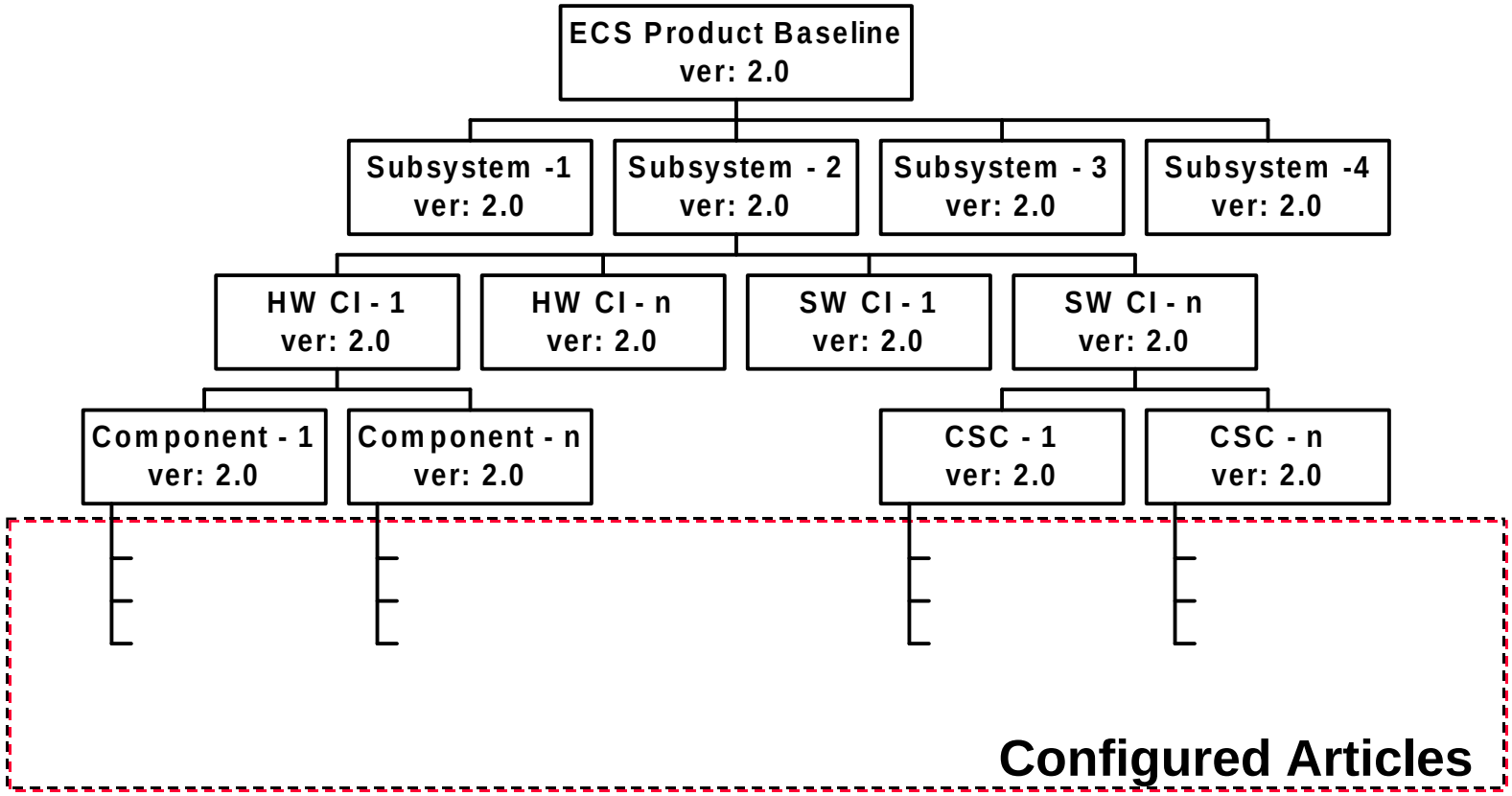
# Baseline Terms and Concepts (Cont.)

- **ECS Structure and Baseline Terms**
  - ***Assembly*: an item made up of other items**
    - ***Parent*: a higher-level item (e.g., an assembly)**
    - ***Child*: an item that is a component of a higher-level item**
  - ***Bill of Material*: list of items that comprise an assembly**
  - ***Product Structure*: the parent-child pairings that define the bill of material for an assembly; each product structure record specifies the effective dates and quantities for a single component of a parent for each engineering change**
  - ***Active Date*: the date a component becomes effective in an assembly's bill of material**
  - ***Inactive Date*: the date a component is no longer effective in an assembly's bill of material**

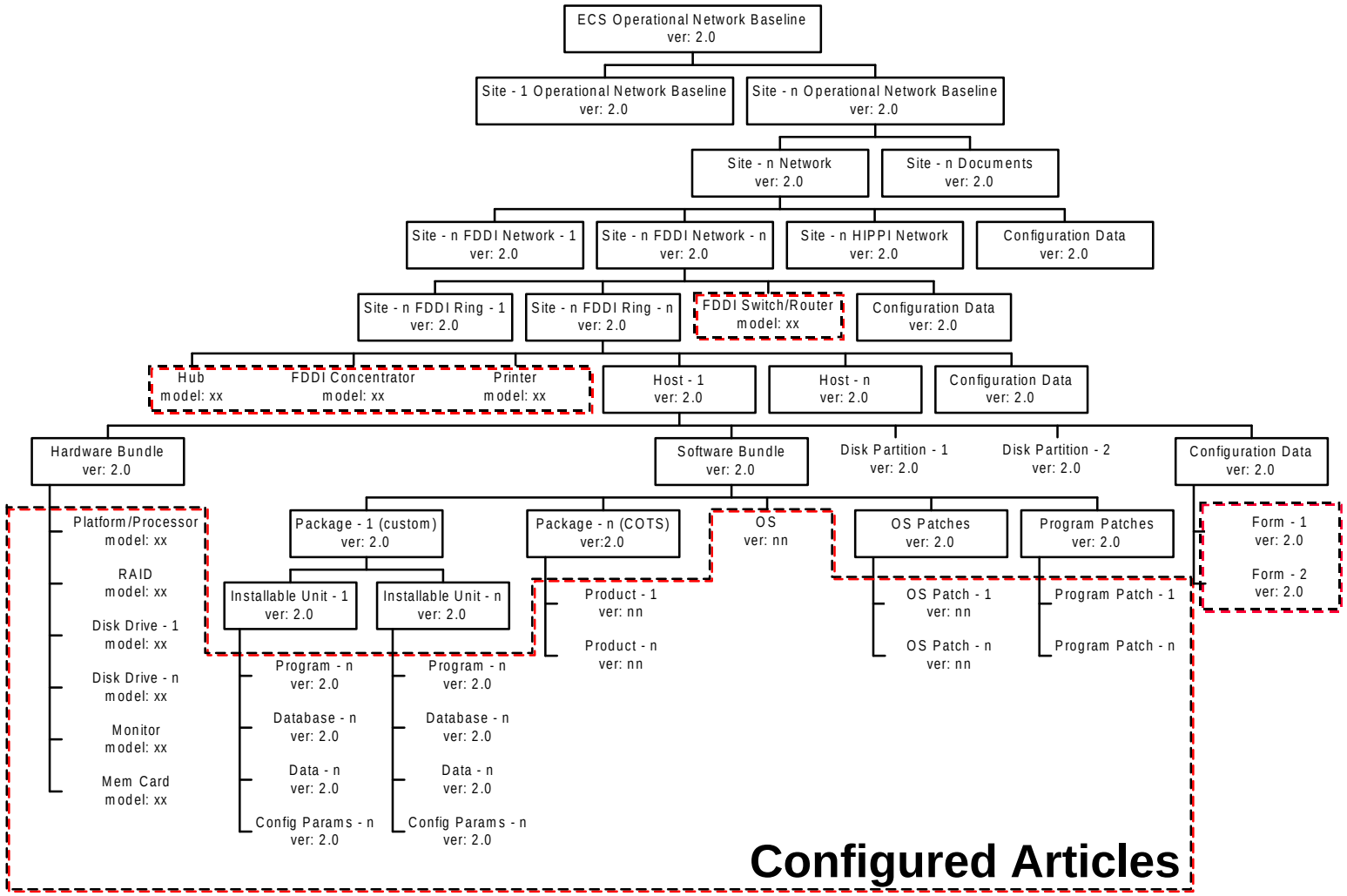
# Baseline Terms and Concepts (Cont.)

- **ECS Structure and Baseline Terms (Cont.)**
  - ***Engineering Change*: a mechanism for grouping, reporting, and controlling product changes collectively**
  - ***Revision*: sequence number of a product structure change to an assembly; signifies a change to the configuration of an assembly that does not alter its form, fit, or function**
  - ***Implementation Status*: a record describing the deployment of a control item to a site and the current state and associated date of its implementation; each control item has one record for each site to which it is deployed**
  - ***Exporting Data*: creating a formatted file or records extracted from the BLM database; control item engineering change, product structure, and interdependency records may be extracted and sent to another BLM site via ftp**
  - ***Importing Data*: loading BLM data from a formatted file**

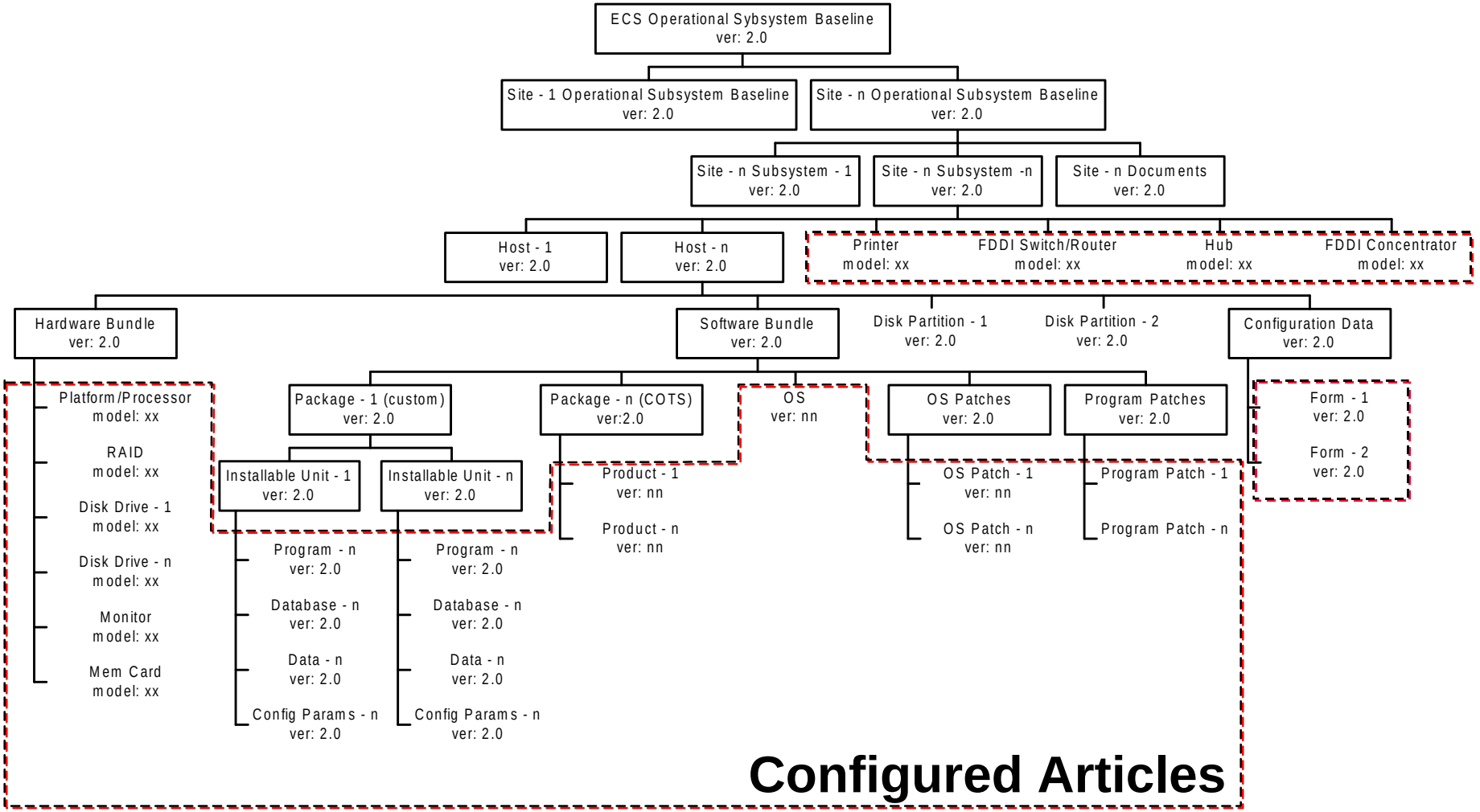
# Product Structure - Design View



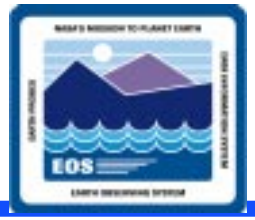
# Product Structure - Operational (Network) View



# Product Structure - Operational (Subsystem) View



# XRP-II Main Screen



XRP-II – Baseline User

ECS Management System

mainm Main Menu 09/12/97 11:15

1. Baseline Management

2. ILM Main Menu

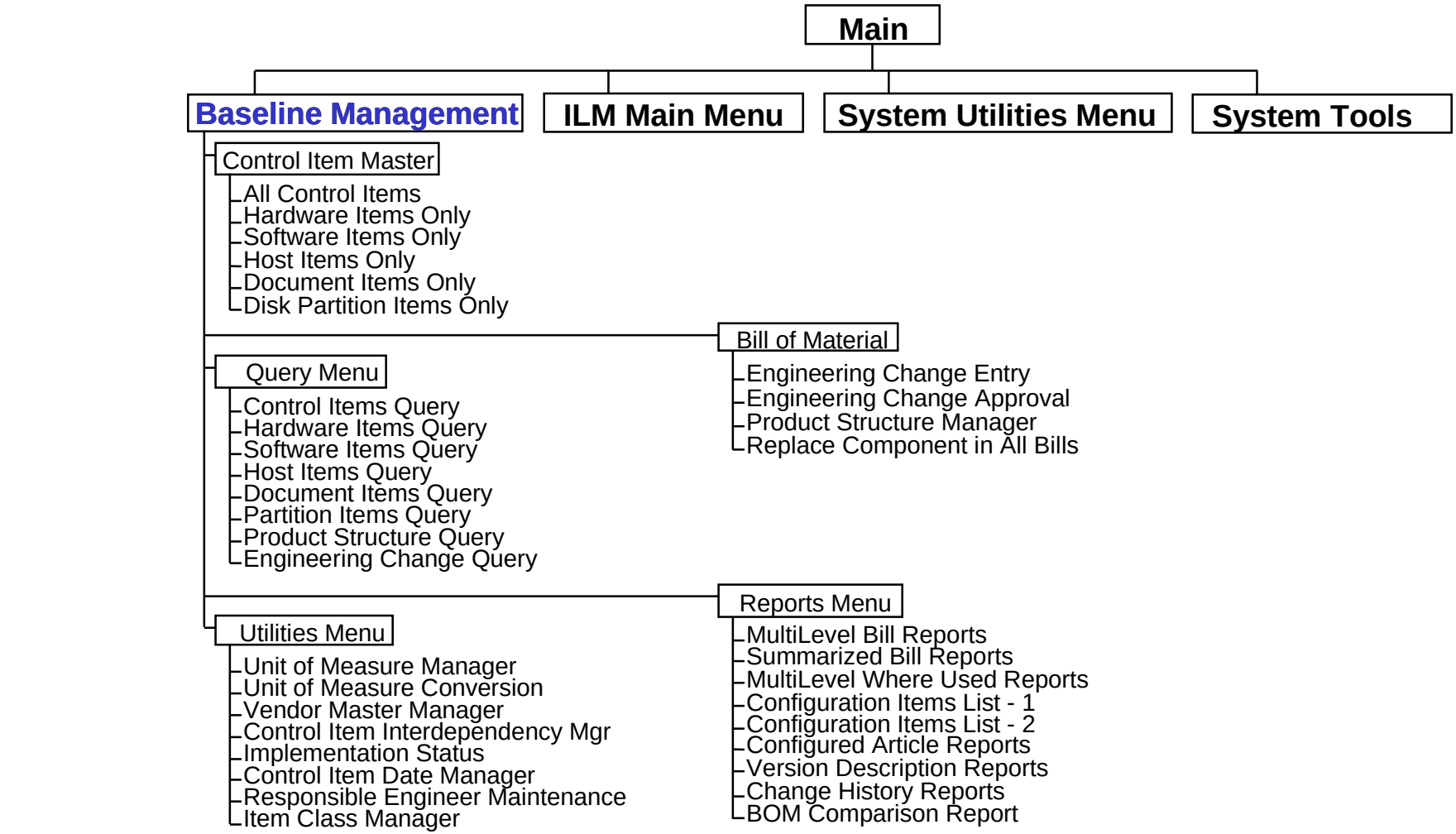
3. System Utilities Menu

4. System Tools

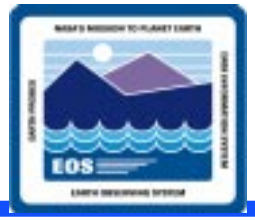
Please enter selection (1 - 4 or name): _____

F1-help F3-prior menu F5-select F8-exit

# XRP-II Hierarchical Menu Structure

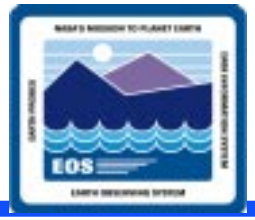


# XRP-II Hierarchical Menu Structure (Cont.)



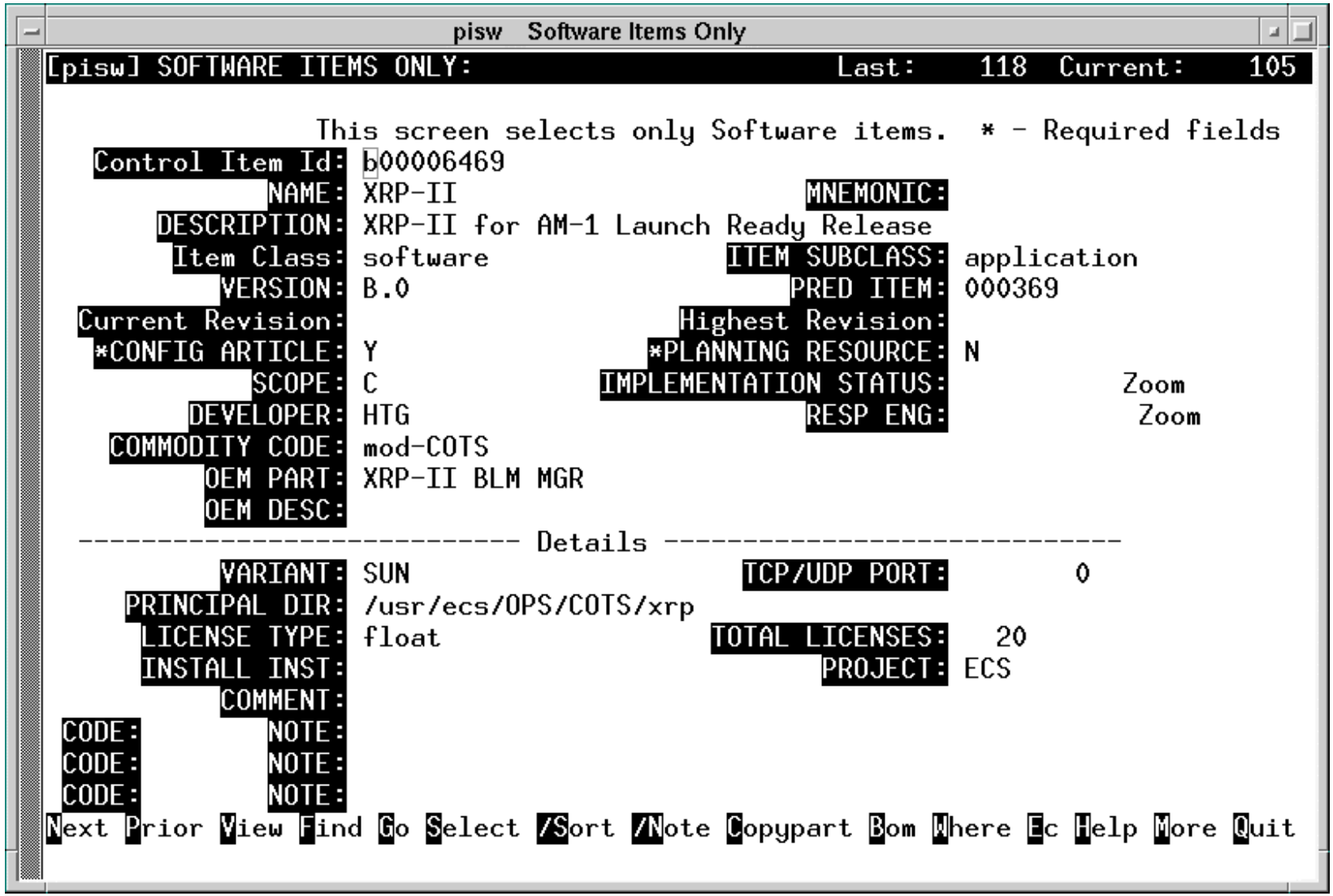

- **Main**
  - **Baseline Management**
    - Maintenance Menu
      - Maintenance Codes
      - Maintenance Contracts
      - Authorized Employees
      - Work Order Entry
      - Work Order Modification
      - Preventative Maintenance Items
      - Generate PM Orders
      - Work Order Parts Replacement History
      - Maintenance Work Order Reports
      - Work Order Status Reports
  - **ILM Main Menu**
    - EIN Transactions
      - EIN Installation
      - EIN Shipment
      - EIN Transfer
      - EIN Archive
      - EIN Relocation
      - Inventory Transaction Query
    - Inventory Ordering Menu
      - Order Point Parameters Manager
      - Generate Order Point Recommendations
      - Recommended Orders Manager
      - Transfer Order Point Orders
      - Consumable Inventory Query
      - Spares Inventory Query
      - Transfer Consumable & Spare Mat'l
    - ILM Master Menu
      - Employee Manager
      - Assembly Manager
      - System Parameters Manager
      - Inventory Location Manager
      - Buyer Manager
      - Hardware/Software Codes
      - Status Code Manager
      - Report Number
      - Export Inventory Data
      - Transaction Log
      - Transaction Archive
      - OEM Part Numbers
      - Shipment Number Manager
      - Carriers
  - **System Utilities Menu**
    - EIN Menu
      - EIN Entry
      - EIN Manager
      - EIN Structure Manager
      - EIN Inventory Query
    - ILM Report Menu
      - ILM Inventory Reports
      - EIN Structure Reports
      - Install/Receipt Report
      - EIN Shipment Reports
      - Transaction History Reports
      - PO Receipt Reports
      - Installation Summary Reports
    - PO/Receiving Menu
      - Material Requisition Manager
      - Material Requisition Master
      - Purchase Order Entry
      - Purchase Order Modification
      - Purchase Order Print
      - Purchase Order Status
      - Receipt Confirmation
      - Print Receipt Reports
      - Purchase Order Processing
      - Vendor Master Manager
  - **System Tools**

# XRP-II Hierarchical Menu Structure (Cont.)

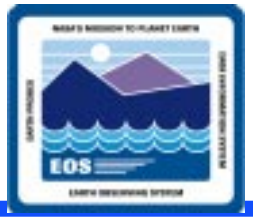



- **Main**
  - **Baseline Management**
  - **ILM Main Menu**
  - **System Utilities Menu**
    - System Parameters Manager
    - Note Code Maintenance
    - Data Delete Utility
    - Calendar Utility
    - Calendar Report
    - Transaction Log
    - Transaction Archive
    - Import BLM Records
    - Export Release Records
    - Export Site-Unique Change Records
    - Export SMC Change Records
  - **System Tools**
    - Screen Manager
    - User Manager
    - Screen Permission Control
    - Menu Manager
    - Data Load Utility

# BLM Software Items Only CHUI



# BLM Engineering Change




```
[pibomsa] ENGINEERING CHANGE APPROVAL:              Last:    417  Current:


          Parent Part: b90001360
  Engineering Change: Training
                Name: Operator Ingest I/F CSC

             PROJECT: ECS
         Date Entered: 09/29/97
          Operator Id: pvan
       APPROVAL CODE: A                    APPROVAL DATE: 09/29/97
                 CCR #:
                  TT:
          SORT ORDER: R    [P=part  R=reference  S=sort #]
             DRAWING:                              REVISION:
  IMPLEMENTATION CODE:
   BASELINE / RELEASE:

          ACTIVE DATE: 09/29/97
        INACTIVE DATE: **/**/**


Next Prior View Find Go Select /Sort /Note Copy-dates Items Help More Quit /Z
```

# ILM EIN Entry & Manager Screens