

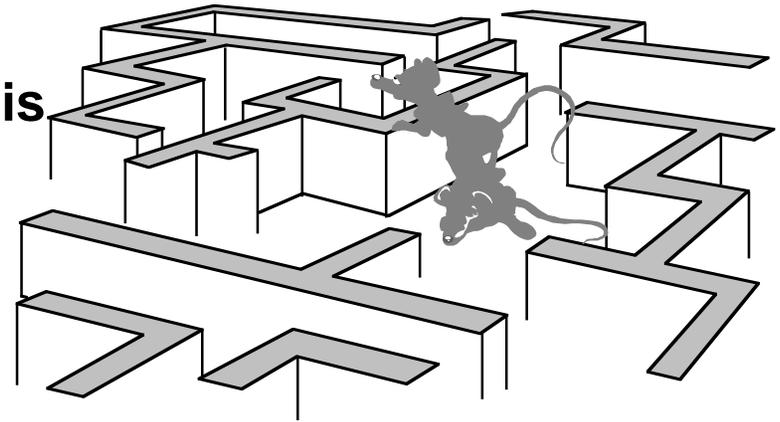
CONFIGURATION MANAGEMENT

ECS Pre-Release B Testbed Training

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
 - Requests for Impact Analysis
- **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
 - Process a hardware 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**

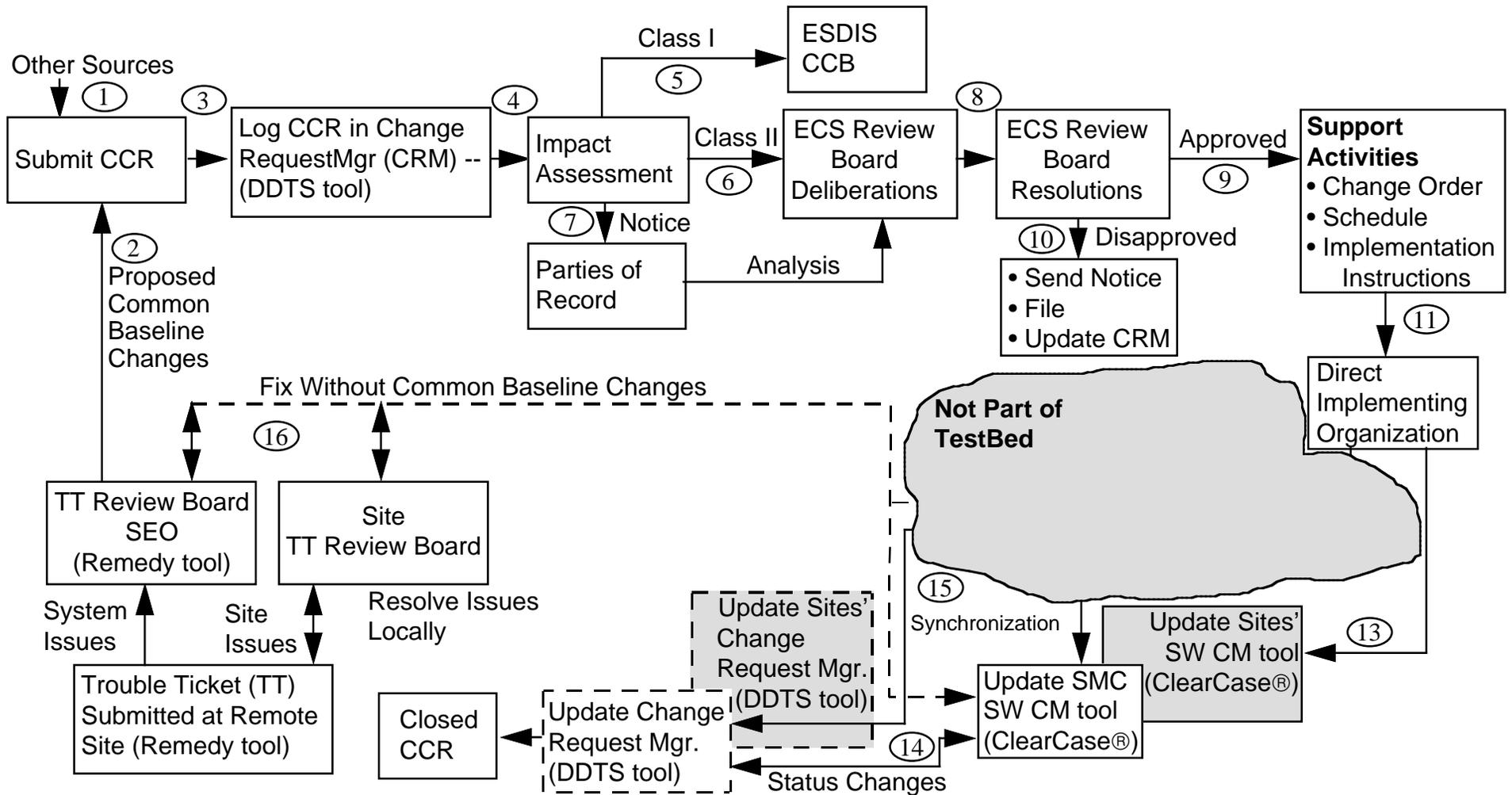


M&O Role and CM Activities



- **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
 - Configuration audits
 - M&O supports internal and ESDIS assessments of project compliance with relevant CM plans

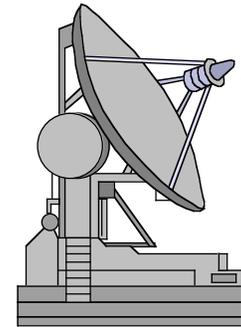
Change Control - SEO Level



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 project software library
 - dissemination of controlled items to sites
 - M&O ensures coordination and availability of needed data

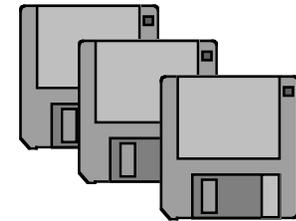


Maintenance of Software Libraries



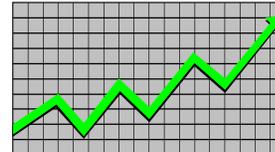
- **Maintenance of M&O Software Library**

- both common and site-specific software
- site personnel responsible for CM associated with library



- **Library supported and controlled by ClearCase®**

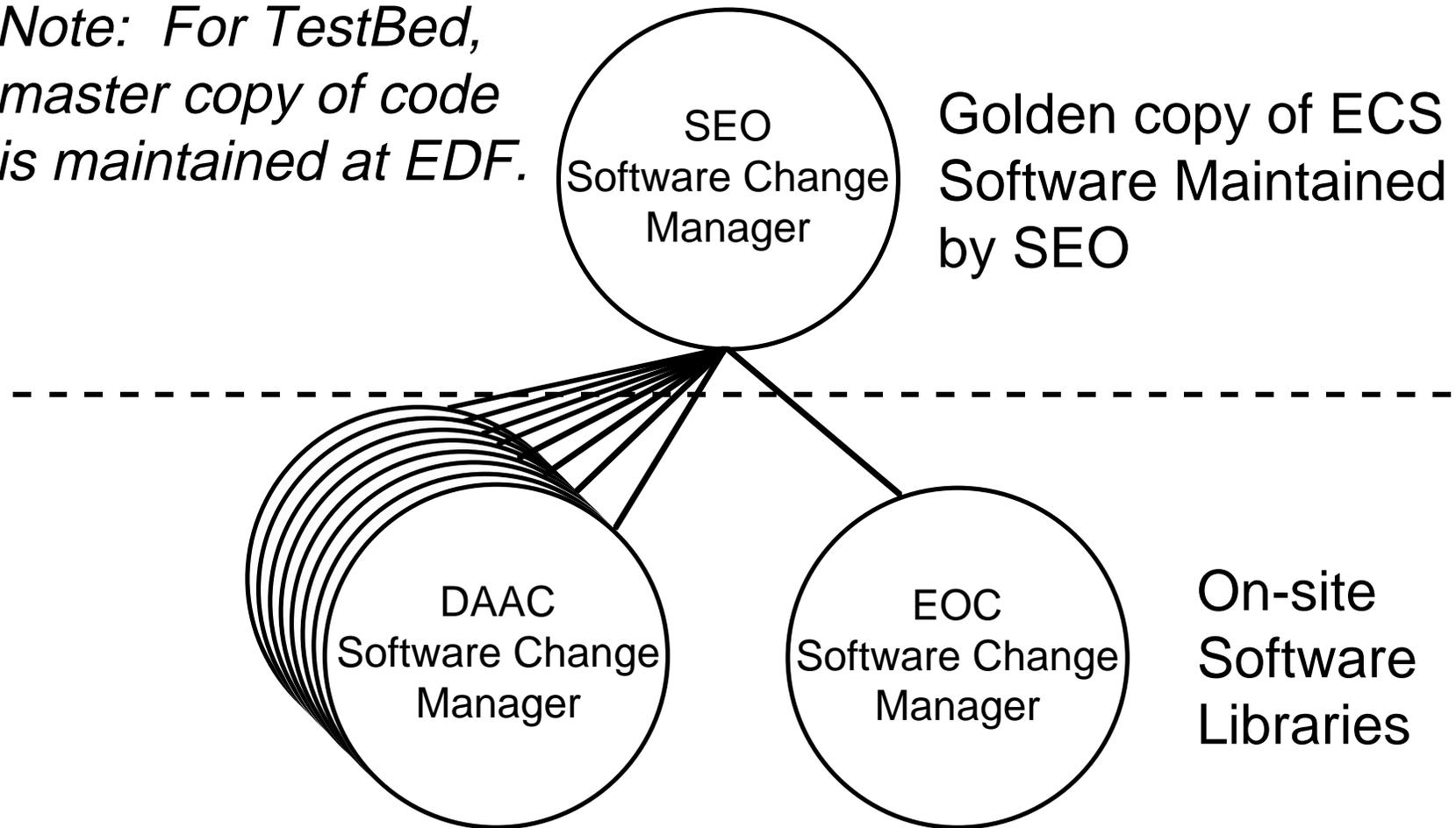
- manages sharing and control of source, object, and executable files
- tracks software build process
- automates enforcement of operational policies and procedures
- tracks source elements and documentation, providing record of configuration items, their attributes, and a change history for each item



Change Control and Software Libraries



Note: For TestBed, master copy of code is maintained at EDF.



M&O Role and CM (Cont.)

(NOTE: No CSR, RRR, ORR for TestBed)



- **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 the fully integrated EOS Ground System (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

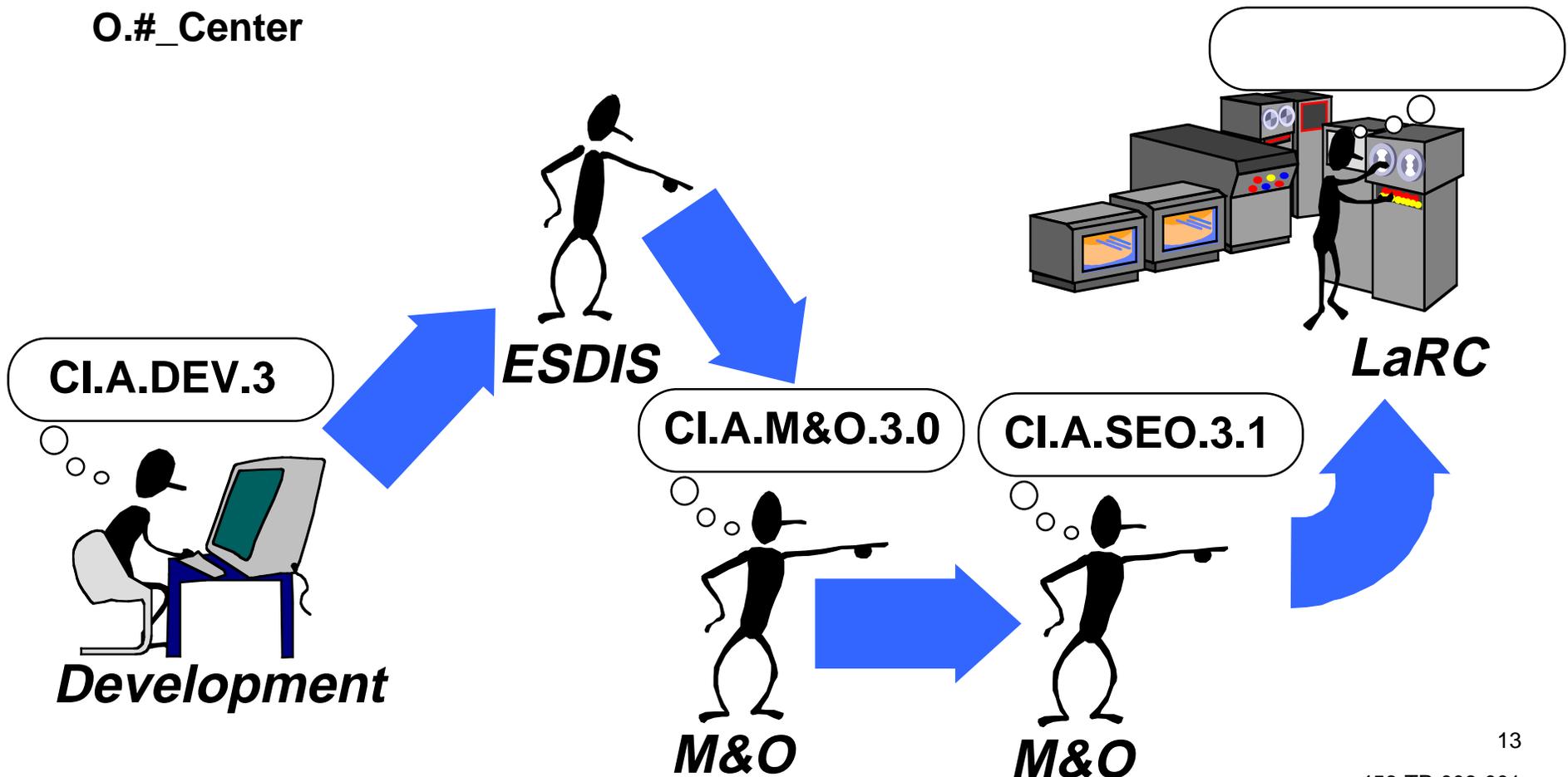


- **Establishes unique identifiers for ECS control items: Hardware, Software, Databases, Documentation**
- **Developer Guideline References**
 - **ESDIS CM Plan**
 - **MO&DSD CM Plan**
 - **ECS M&O CM Plan**
 - **Software Build Process Project Instruction**
 - **Software Naming Conventions Project Instruction**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

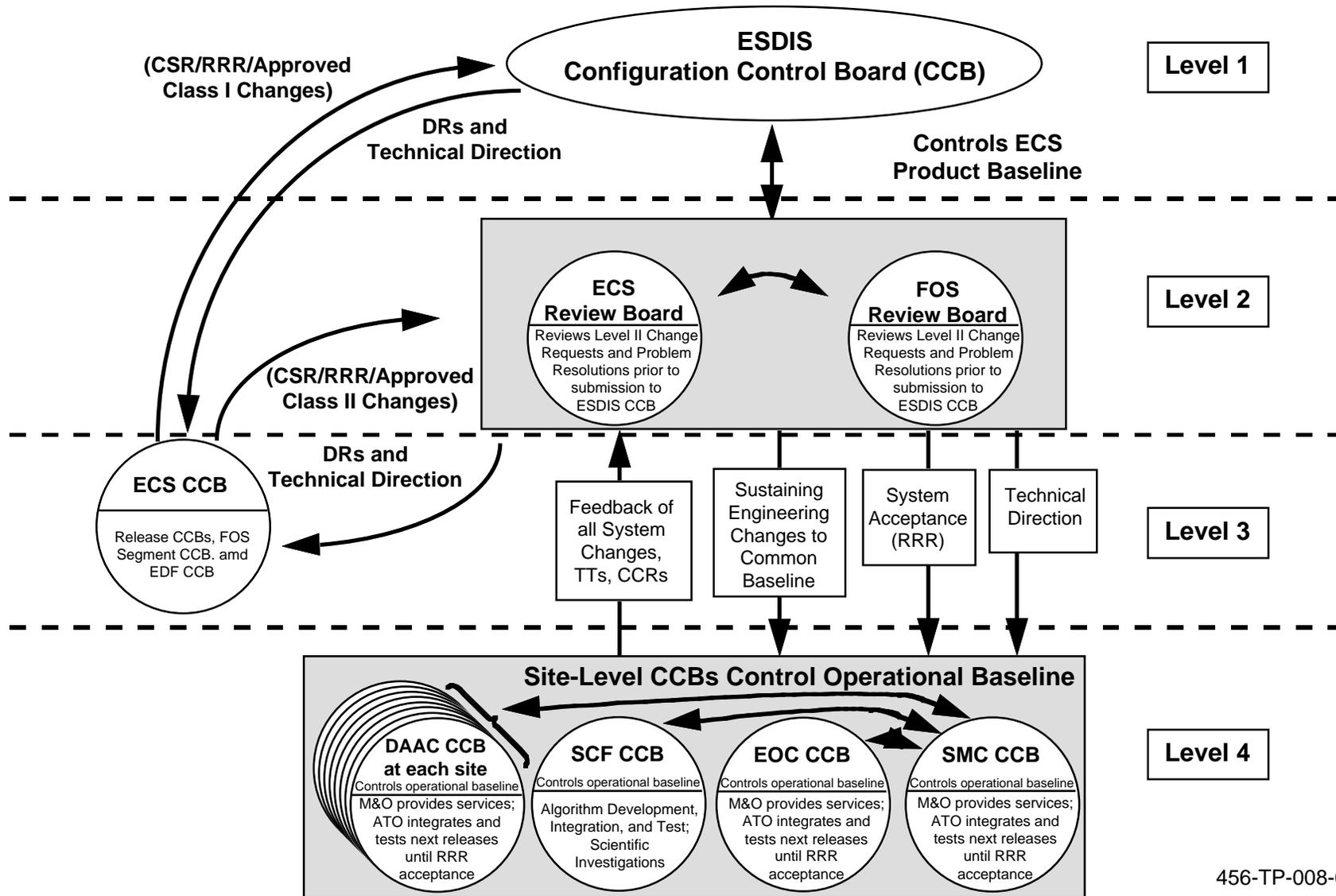
Configuration Identification (Cont.)



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



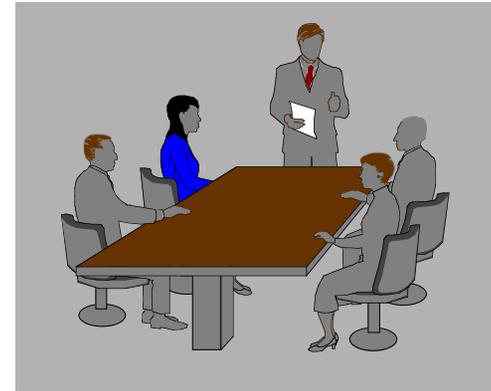
CCB Hierarchy



CM Responsibilities



- **ESDIS Management**
 - establishes ECS CM policies
- **CCBs**
 - classify, prioritize, evaluate, recommend, and approve (within their authority) changes to baselines
- **CM Administrators (at SEO, 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)

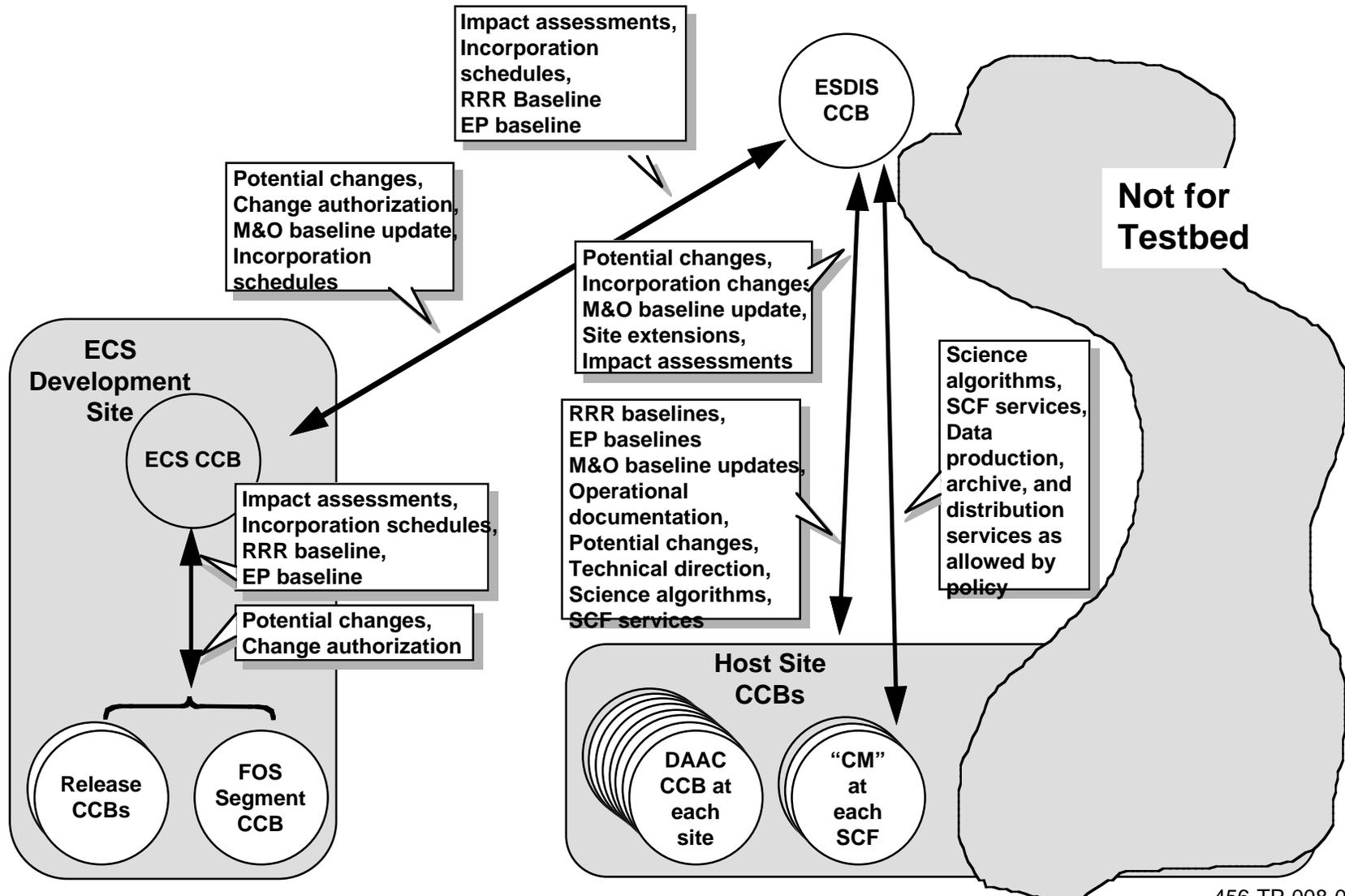


CM Responsibilities (cont.)



- **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

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 ECS Review 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 Emergency <input type="checkbox"/> Urgent <input type="checkbox"/> Routine <input type="checkbox"/>	6. Change Class	7. Status		
8. CCR Title:						
9. Originator: _____ Org: _____ e-mail: _____ phone: _____						
10. Approval: _____ signature _____ date _____						
11. Reason for Change <div style="text-align: right;">(indicate attachment ___)</div>						
12. Description of Change <div style="text-align: right;">(indicate attachment ___)</div>						
13. Impact Analysis: Cost: <input type="checkbox"/> None <input type="checkbox"/> Small <input type="checkbox"/> Medium <input type="checkbox"/> Large <small>(Not exceeding \$100,000) (\$100,000 to \$500,000) (Over \$500,000)</small> 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) <div style="text-align: right;">(indicate attachment ___)</div>						
15. Board Action: <input type="checkbox"/> Approved <input type="checkbox"/> Withdrawn <input type="checkbox"/> Disapproved <input type="checkbox"/> Deferred Until _____ <div style="text-align: right;">date</div> Further Action Required: <input type="checkbox"/> ECP <input type="checkbox"/> Waiver <input type="checkbox"/> Deviation <input type="checkbox"/> Tech Direction <input type="checkbox"/> Contract Mod. <input type="checkbox"/> DCN Other: _____						
16. CCB Approval Chair: _____ <div style="display: flex; justify-content: space-between;"> signature date </div>				17. CCR Implemented CM Admin. signature: _____ date: _____		

Change Request Manager (DDTS)



PureDDTS 3.2.1

File Select Metrics Options Special/Support To Do List Help

'Change_Request' Records [SNAORTVCDF] [ECS_CHNG_REQ] 1 record

1	MSSdd00617	Add GUI to X11 Program (Example Only)	II	routine
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Submit Commit Clone Refresh Clear Next Prev Print... Gripe

The workspace currently contains 1 record

Record

Modify Change_State Links CM Help

ECS_CHNG_REQ Page 1/3

CCR Number: MSSdd00617 Submitted: 960521 Revision:
Priority: routine Change Class: II
Status: New Enclosures: 3

Title:
Add GUI to X11 Program (Example Only)

CCR ORIGINATOR INFORMATION
Originator Name: Joseph Minkler
Organization: GSFC
Phone Number: (904)583-9736
Organization Evaluation Engineer: J. Holson

CONFIGURATION MANAGEMENT ADMINISTRATOR
CM Admin. Name: efinch
Organization: GSFC
Phone Number: (301)935-4738

Enclosures

History Proposed Change Impact Summary Resolution

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 DAAC procedures**
- **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: _____

Evaluation Engineer: _____
Evaluation Engineer Point of Contact:
address: _____

phone: _____
e-mail: _____
Requested Return Date: _____

CCB Schedule Date: _____
CCR Number: _____
CCR Log Date: _____
CCR Originator: _____
CCR Originator Point of Contract:
address: _____

phone: _____
e-mail: _____

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



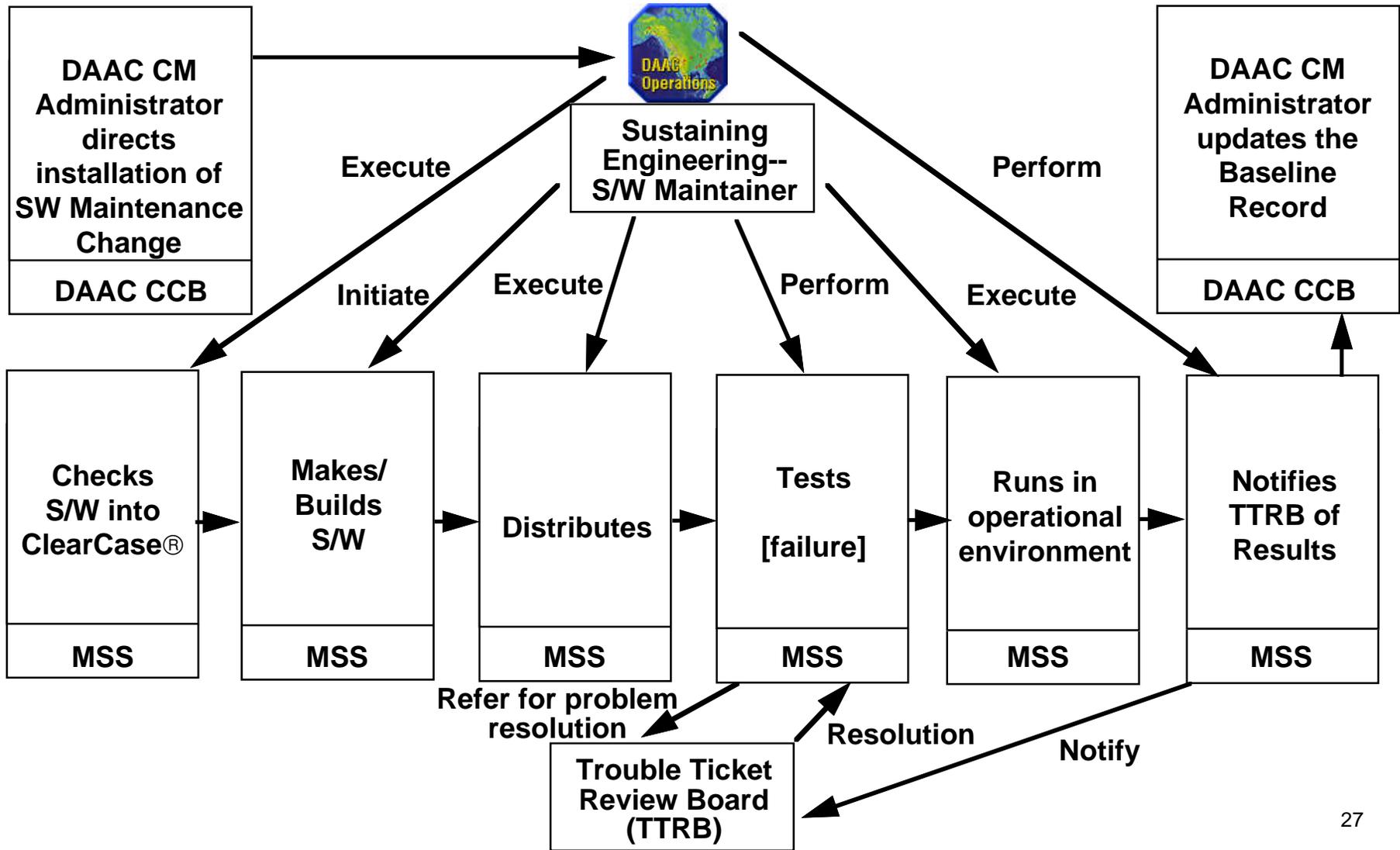
- **Software release is through ESDIS SMC or, with ESDIS permission, directly to the sites**
 - Version Description Document (VDD) provides summary documentation package
 - ECS Project CMO assembles and packages the delivery
- **Change Scenarios**
 - COTS software problem
 - custom software problem
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

Software Transfer and Installation

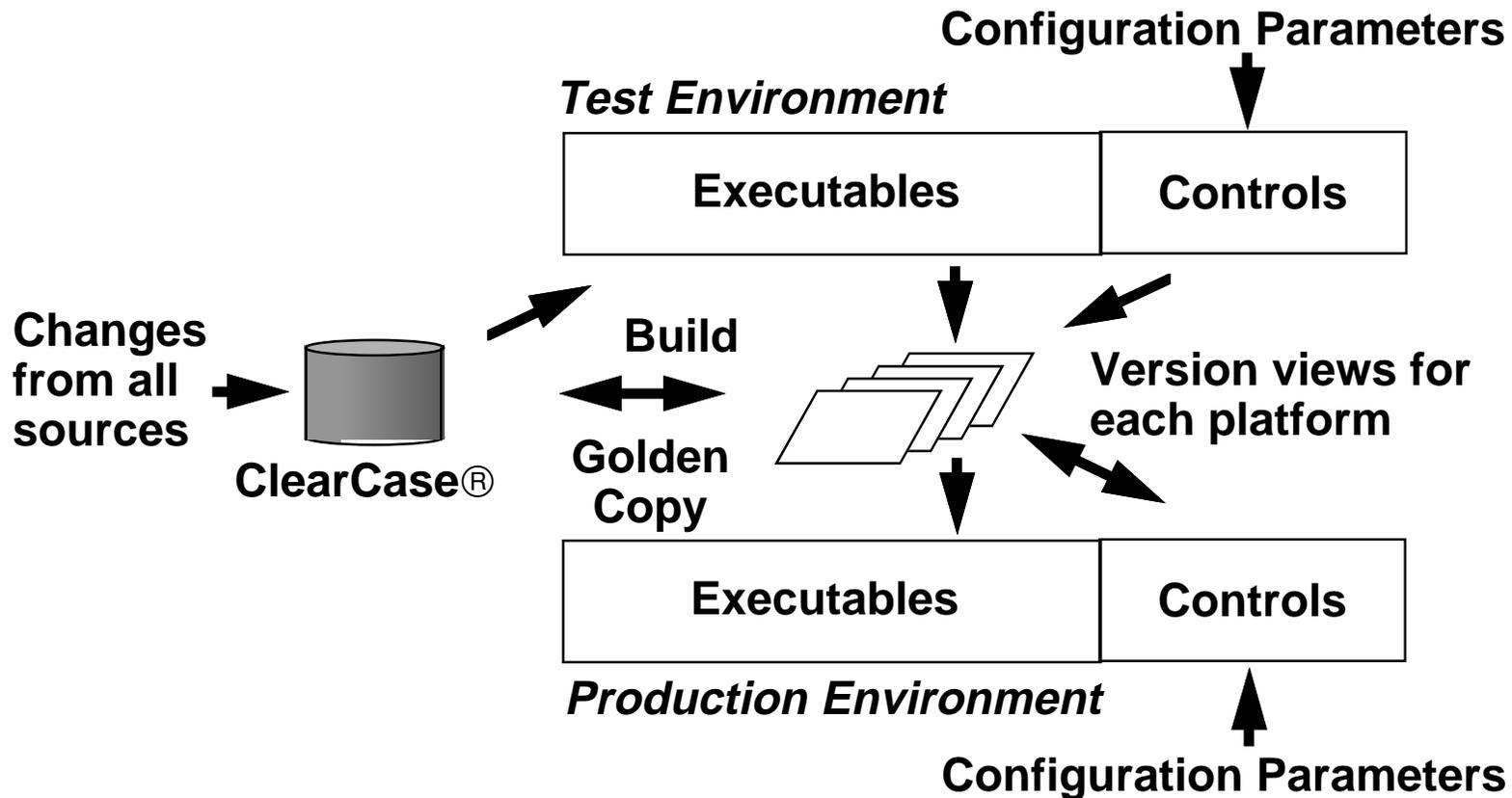


- **Change originates at SEO**
- **SEO CM Administrator provides ECS system-wide CM**
- **SEO CM Administrator directs transfer to DAAC drop-off point**
- **SEO CM Administrator ensures that changes are properly documented and coordinated**

Software Transfer & Installation: Installation Functional Flow



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)**
 - ESDIS approves establishment of operations baseline
 - Configuration baseline recorded in Version Description Document (VDD)
 - 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

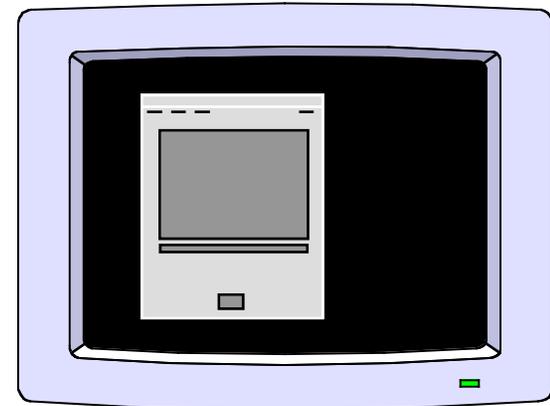


- **SEO supports FCA/PCA by the Acceptance Testing Organization (ATO) at RRR**
- **SEO conducts internal audits**
 - CM policies, procedures, and practices followed
 - Proper implementation of approved changes
 - As-built documentation reflects deployed configuration
- **SEO supports ESDIS CM audits**
 - 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
- **Related tools**
 - From Management Subfunction software
 - Trouble Ticket System (TTS)
 - Problem reporting and tracking
 - Used by users, operators, system administrators



CCR Approval Flow

