Configuration Identification and Processing New Configuration Items

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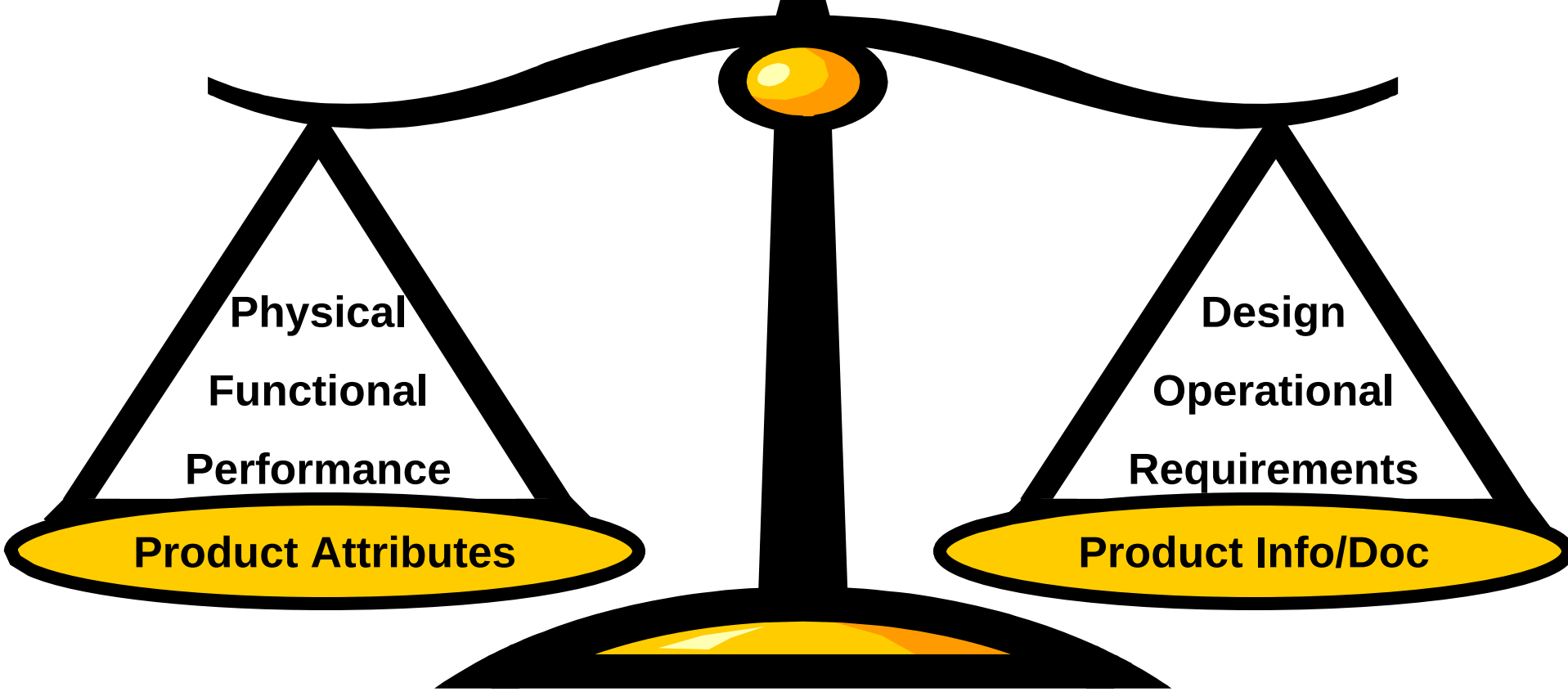
What Is CM?

- ***Configuration Management is "a <u>process</u> for establishing and maintaining <u>consistency</u> of a <u>product</u>'s performance, functional and physical attributes <u>with</u> its requirements, design, and operational information <u>throughout its life</u>." - MIL-HDBK-61***
- There are 6 basic CM principles
  - CM Planning and Management
  - Configuration Identification
  - Configuration Control
  - Configuration Status Accounting
  - Configuration Audits and Assessments
  - Data Management

Configuration Management

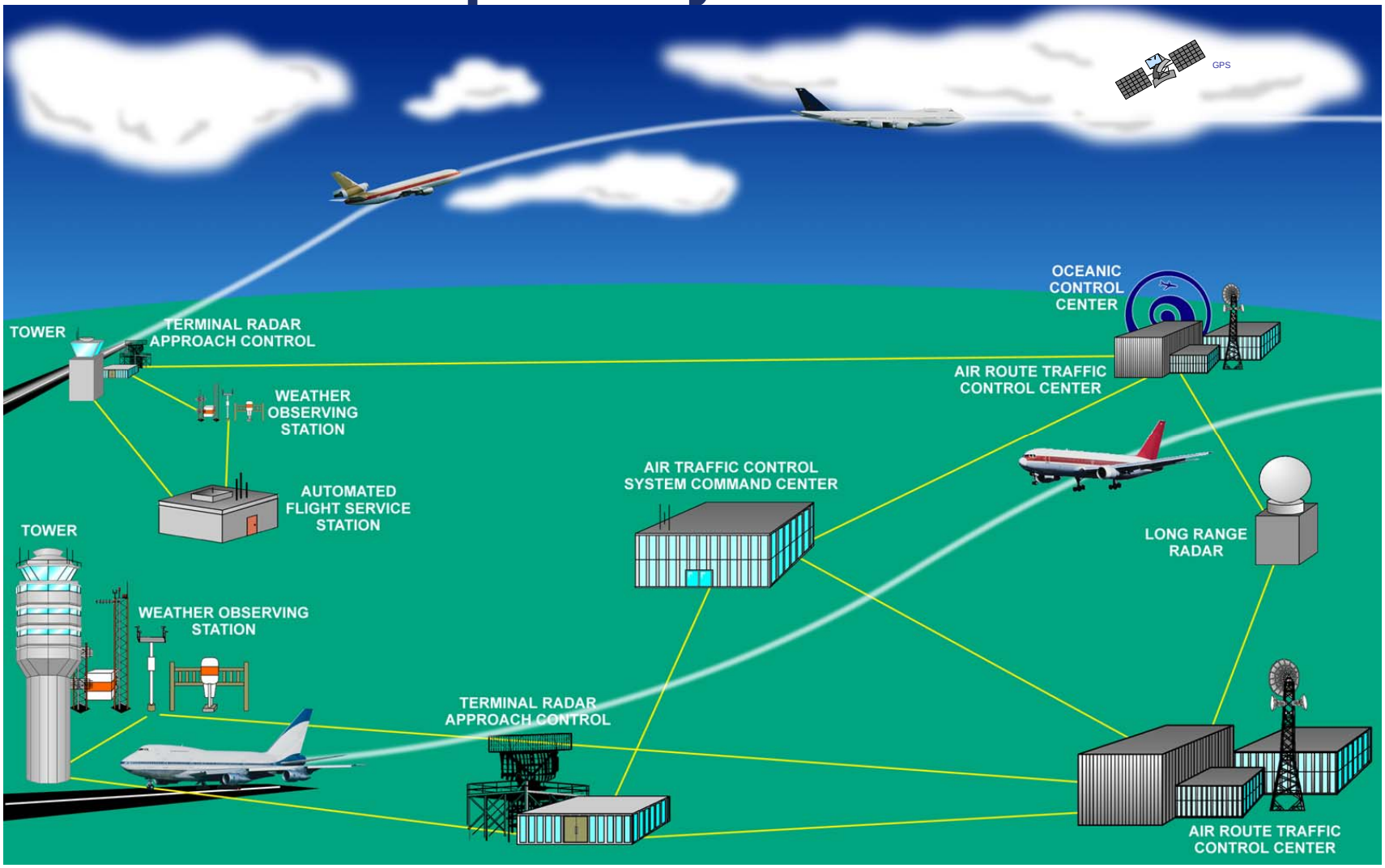


Tenets of Configuration Management

✓CM Planning & Management ✓Configuration Identification ✓Change Management

✓Configuration Status Accounting ✓Configuration Audits/Assessments

National Airspace System



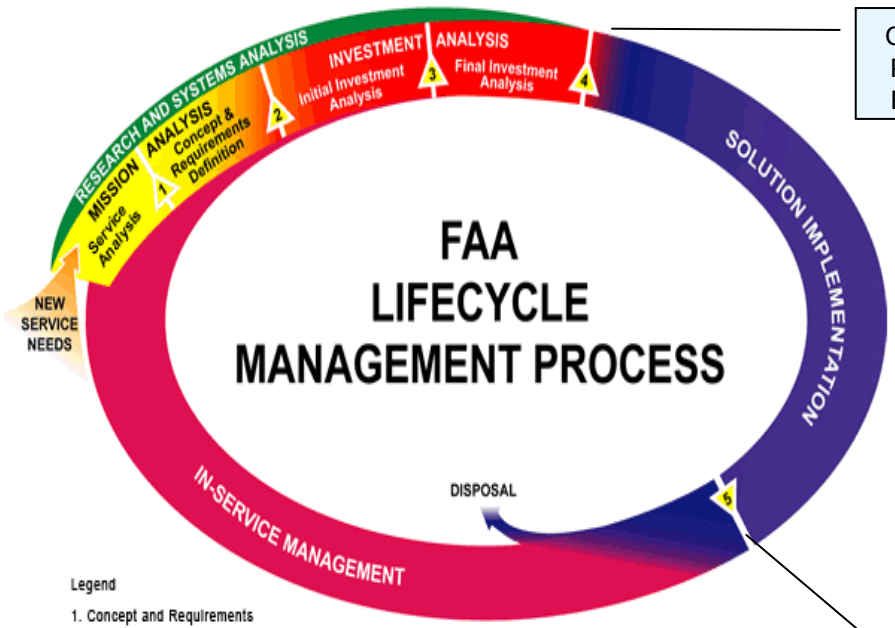
AMS and Configuration Management

- Ensure CM requirements and resources for the life cycle are allocated

OMB 300 Program Baseline

Manage Program Requirements via the NCP process

- Provide trend analysis data
- Facilitate discussions on new capabilities with current configurations



- Build on initial configuration identification performed during IA
- Implement CM Planning and Management
- Initiate Change Management and Status Accounting activities
- Conduct FCA/PCA to support system acceptance

- Track cost of NAS changes
- Manage fielded systems
- Modification Tracking
- Facility and other audits

In-Service Review and Decision (ISR/ISD)

Baseline Product Configuration

Configuration Management Tenets

FAA CM

CM Planning & Management

- **CM Policy & Procedures**
- **Enterprise CM CMPP**
- **CCB Charters & Operating Procedures**
- **CM Plans**

Configuration Identification

- **Identify Items to be Managed**
- **Establish Baselines**
  - Developmental
  - Functional
  - Allocated
  - Product
  - Operational

Configuration Control

- **Identify Need**
- **Describe Change**
- **Coordinate and Review**
- **Disposition Change**
- **Implement Change**
- **Monitor Implementation**
- **Capture Change Data**

Configuration Status Accounting

- **Capture Vendor Change Vehicle (PTR/HDR/ECP) Status**
- **Capture CF/NCP/CCD Status**
- **Capture Change Release (SSD, STB) Status**
- **Capture Associated Baseline Status**

Configuration Audits

- **Monitoring and Oversight**
  - Agency CM Operations
  - Contractor CM
- **Manage & Verify**
  - Internal Audits
  - FCA/PCA
  - Baselines

Information/Data Management

Secure Storage of and Accessibility to Digital Data. Includes Configuration Data and Related Program Information such as:

• Documents • Drawings • SW Code • Change Data • Plans

AMS and Configuration Management Another View

CM has a key role to play throughout the AMS process as depicted below.

1.0 Mission Analysis

- Initiate Project
- Define Scope and Business Case
- Initial Requirements

Go / No-Go — LOB Business Objectives

- Add to LOB Roadmap
- Update Portfolio
- Coordinate With AIO
- Analyze Candidate Architectures
- Define CM Strategy and Plan
- Procure Resources

INCEPTION (AVNISM EX.)

2.0 Investment Analysis

- Refine Requirements
- Establish Requirements Traceability Matrix (RTM)
- Design Architecture
- Create and Test Architectural Proof
- Define Test Strategy
- Define Security Strategy
- Request or Conduct Review
- Provide Results
- Update EA & Segment Architecture
- Complete Procurement
- Create Configuration Item and assign to CCB

ELABORATION

3.0 Solution Development

- Design & Build Requirements
- Update RTM
- Prepare For Security Testing
- Test The System
- Develop System Support Materials
- Request or Conduct Design Review
- Provide Results
- Setup Test Environment

CONSTRUCTION

4.0 Implementation

Prepare and Audit CM Baselines

Perform Acc. Test

- Obtain C & A
- Train Users

Go / No-Go — LOB Op Readiness

- Gain CCB Approval of CM Product Baseline
- Request or Conduct Readiness Review
- Deploy System

TRANSITION

5.0 In Service Management

- Operations & Support
- Program Control
- Contract Management
- Quality Assurance
- IT Security
- Configuration Management
- Maintain System
- Evaluate System

OPS /EVALUATION

6.0 Retire

Decommission System

CM Planning and Management

Informal Management of Work Products (Strategy and Plans, Concepts, Requirements, Interfaces, etc.)

Functional Baseline

Product Baseline

Configuration Identification (Formal)/Baseline Management

Change Management

Configuration Status Accounting

Configuration Audits and Assessments

Definition

- **Configuration Item (CI)** *(reference MIL-HDBK-61)*
  - Any hardware, software or combination of both that satisfies an end-use function and is designated for separate configuration management.

Definition

- **Configuration Identification** *(as defined in MIL-HDBK-61)*
  - (1) The systematic process of selecting the product attributes, organizing associated information about the attributes, and stating the attributes.
  - (2) Unique identifiers for a product and its configuration documents.
  - (3) The configuration management activity that encompasses the selection of CIs; the determination of the types of configuration documentation required for each CI; the issuance of numbers and other identifiers affixed to the CIs and to the technical documentation that defines the CI's configuration; the release of CIs and their associated configuration documentation; and the establishment of configuration baselines for CIs.
- **Activities**
  - Selecting/defining configuration items
    - Configuration item: an aggregate of hardware or software that satisfies an end-use function
  - Generating parts/items identifiers
    - Consistent nomenclature
    - Reflects relative arrangement of parts
  - Generating releases
    - Release: a designating activity that verifies that documents, hardware, drawings, and/or code is complete and suitable for use
  - Providing media identification
  - Establishing baselines
    - Baseline: a collection of formal configuration documentation
    - Typical baselines include: Functional, Allocated, Developmental, and Product Baselines

Configuration Identification

- **Configuration Identification is the basis for all other configuration management processes:**
  - Master Configuration Index (MCI)
  - NAS-MD-001 (report of all baselined NAS Subsystems/facilities)
  - Configuration Control (casefile/NCPs)
  - Status Accounting
  - Auditing/Assessments

Configuration Identification

- **Policy Fundamentals:**
  - Selecting Configuration Items (CIs)
  - Developing Configuration Documentation (NAS Baselines)
  - Developing Product Top-Down Structure
  - Assignment and Marking of Unique Identifiers
  - Data Management (including digital data)

Configuration Identification – Key Lifecycle Intersects

Configuration Identification has many touch-points throughout the AMS process

1.0 Mission Analysis	2.0 Investment Analysis	3.0 Solution Development	4.0 Implementation	5.0 In Service Management	6.0 Retire
▸ Create Program Office ▸ Create Prototype ▸ Test Prototype ▸ Examine Existing Interfaces ▸ Define Product Structure ▸ Define Services ▸ Define CM Strategy ▸ Create CM Plan ▸ Add to LOB Roadmap ▸ Map to NASEA	▸ Define Transition Plan ▸ Approved CM Strategy ▸ Approved CM Plan ▸ Funding Approved ▸ Add CI to WebCM ▸ Add CI to MCI ▸ ADD CI to NASEA ▸ ADD CI to CCB Charter	▸ Publish Services ▸ Create IRD/ICD(s) ▸ Update IRD/ICD(s) ▸ Create Product Baseline Documents ▸ Key Site Testing ▸ Create PBLI ▸ Establish PSL	▸ Create FSEP Data Entry(s) ▸ Key Site Deployment ▸ Baseline Product Documents in MCI ▸ Create SSD Entry(s) ▸ PBLI Approved	▸ Tech Refresh ▸ Re-Host ▸ Interface to new Systems	Decommission System
INCEPTION	ELABORATION	CONSTRUCTION	TRANSITION	OPERATIONS	

CM Planning and Management

Informal Management of Work Products (Strategy and Plans, Concepts, Requirements, Interfaces, etc.)

Functional Baseline

Product Baseline

Configuration Identification (Formal)/Baseline Management

Change Management

Configuration Status Accounting

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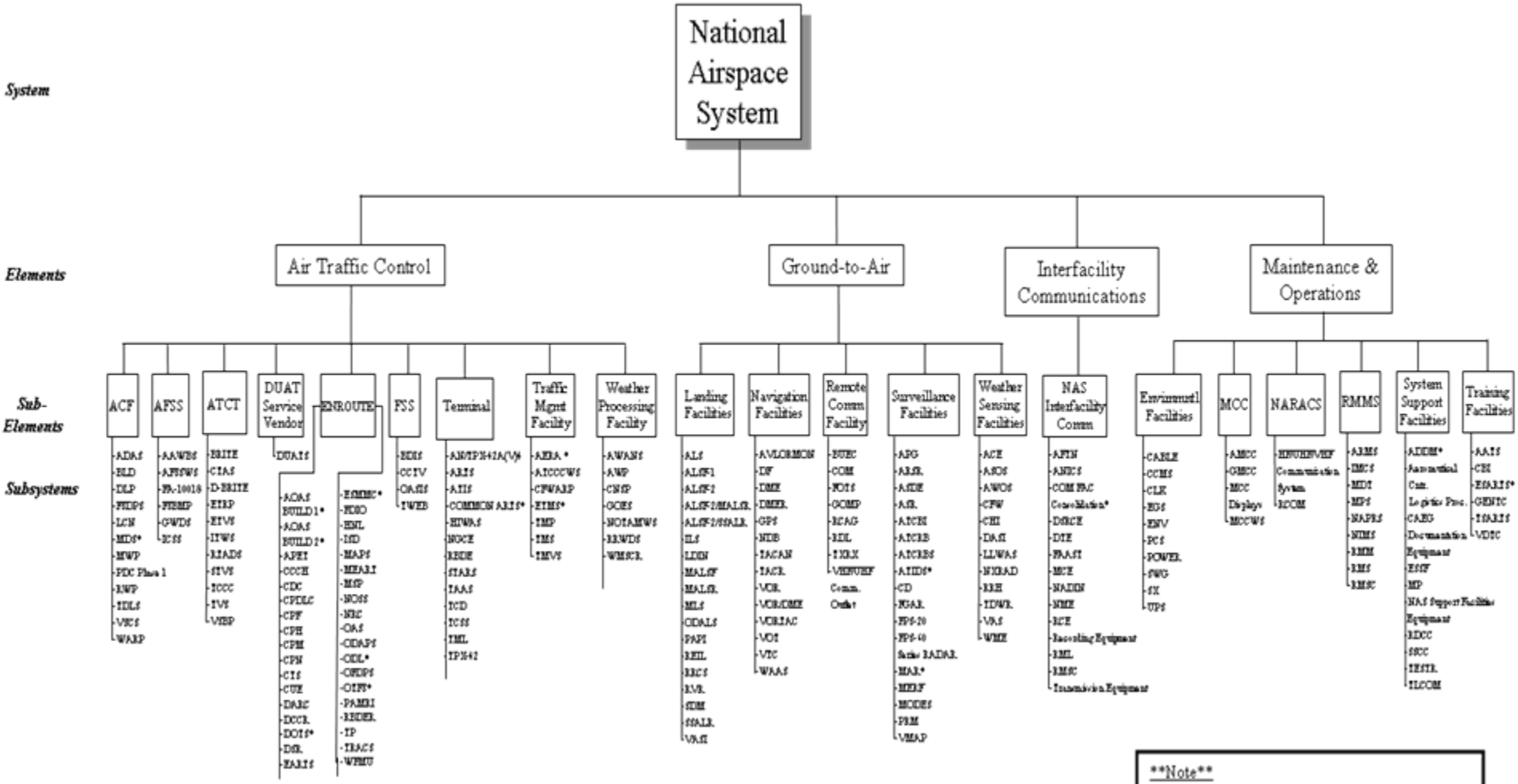
Master Configuration Index (MCI)

JULY 1998



Note
This chart represents configuration items (CI) and their relationships down to the first subsystem level as captured in DOCCON. Both baselined and non-baslined (*) subsystems are represented.

Configuration Identification Timeline

- **Past (circa 1980s) – Configuration Identification appeared to be top-down driven and controlled via NAS-SR-1000, NAS-SS-1000, NAS-DD-1000**

- **Present - Configuration Identification appears to be bottom-up and service unit driven with very little controls and lack of integration across business processes/activities (NASEA, FSEP, SSDs, CM)**

- **Future - Configuration Identification Challenges and Opportunities: SOA, NextGen...**

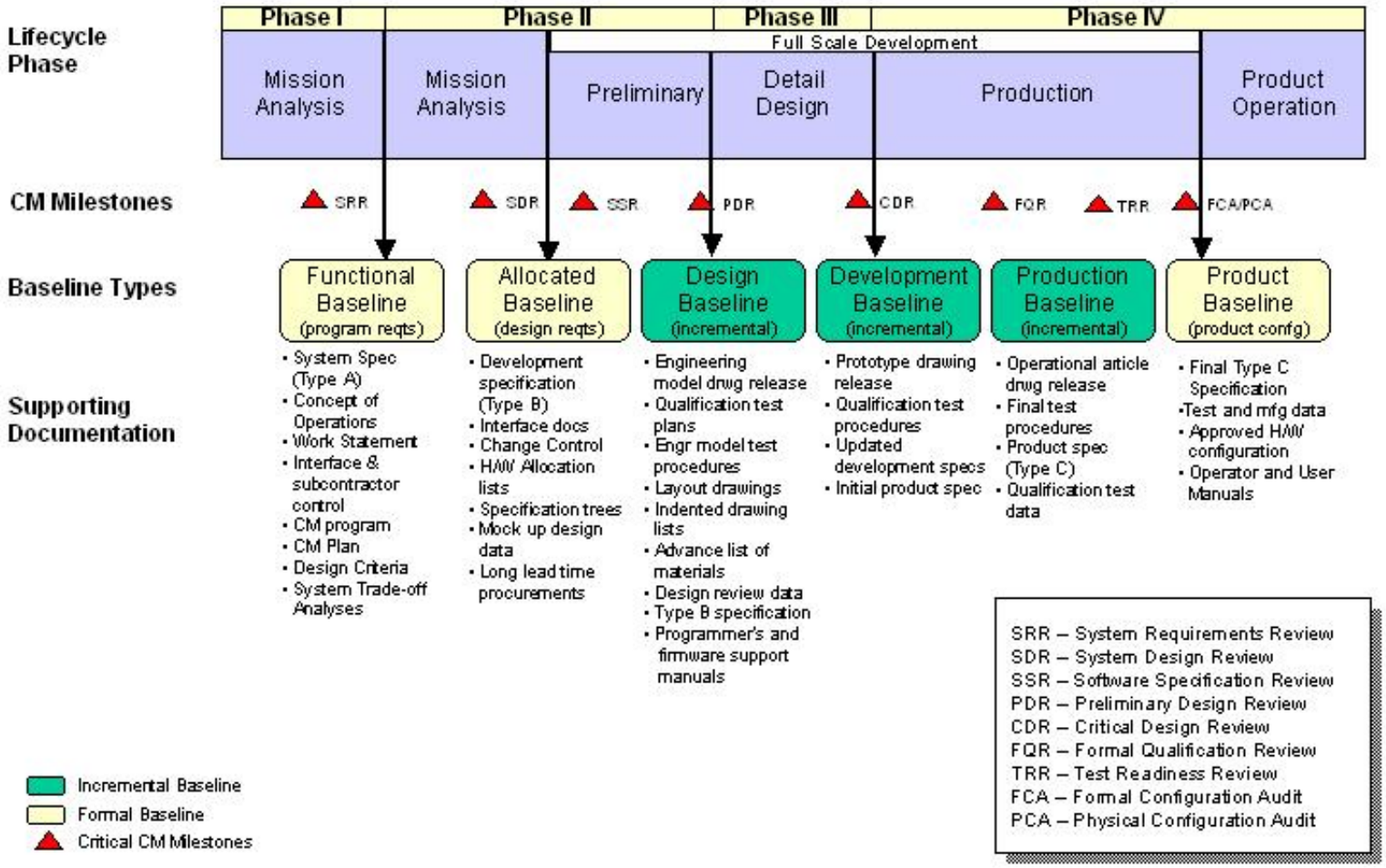
Configuration Identification

- **Some Considerations for CI Selection:**
  - Logistics/life cycle
  - Complexity
  - Criticality
  - Interfaces
  - Susceptibility to change
  - Maintenance
  - Documentation
  - Subassembly characteristics
  - Size

Configuration Identification

- **Establishing and Maintaining Baselines:**
  - NAS Functional Baseline (e.g. NAS Level Requirements and FRDs)
  - Functional Baseline (e.g. System Level Specs, IRDs)
  - Product Baseline (e.g. Product specs, Drawing Packages, Software Specs, Version Description Documentation, Technical Instruction Books)
  - Operational Baseline (Product + Changes)
  - Facility Baselines

NAS CM and the Product Development Process



Configuration Identification

- **Master Configuration Index (MCI) intended to reflect:**
  - Current hierarchical representation of the NAS by identifying each NAS subsystem/facility and its relationship to other NAS subsystems/facilities
  - Current configuration identification data for each subsystem/facility
  - Current engineering and technical documentation (including drawings) for each subsystem/facility, including all approved changes to the documentation

MCI

- **The Master Configuration Index (MCI) reflects the "as is" detail for the NAS**
- **It provides a snapshot of the current NAS baseline, allowing the FAA to assess progress towards the future NAS**
- **NAS-MD-001 is a report of all baselined NAS Subsystems & facilities contained in the MCI**
- **The MCI is maintained by the Enterprise CM organization (Documentation Control Center – DCC)**
- **The MCI captures data from the change process:**
  - Configuration items
  - Approved, baseline documents
  - Relationships between CIs, documents, change decisions and change releases
- **The future NAS is captured in the NAS Enterprise Architecture (NASEA). It shows the transition from the as-is to the to-be.**

NAS-MD-001 and NASEA

- **Examples from the FAA websites**

Configuration Identification

- **Assignment of Corporate Level Identifiers/Numbers :**
  - System-Level Specification
  - Interface Requirements Documents (IRD)
  - Interface Control Document (ICD)
  - FAA Type Numbers for Equipment

Product Lifecycle Phases and Baselines

MISSION ANALYSIS

INVESTMENT ANALYSIS

Phase I — Concept Exploration

- Identification of Need
- Requirements Analysis
- Operational Requirements
- Maintenance and Support Concept
- Feasibility Analysis
- Selection of Technical Approach
- Functional Definition
- System and Program Planning

→ Functional Baseline (program reqts)

SOLUTION IMPLEMENTATION

Phase II — Preliminary Design – Solution Implementation

- Functional Analysis
- Requirements Allocation
- Trade-off Studies
- Synthesis
- Preliminary Design
- Test & Evaluation of Design Concepts (early prototyping)
- Acquisition Plans
- Contracting
- Program Implementation
- Supplier Activities

↔ Allocated Baseline (design reqts)

→ Design Baseline

Phase III — Detail Design and Development

- Subsystem Component Design
- Trade-off Studies/Alternatives Evaluation
- Development of Engineering Prototype Models
- Verification of Manufacturing and Production Processes
- Developmental Test & Evaluation
- Supplier Activities
- Production Planning

→ Development Baseline

IN-SERVICE MANAGEMENT

Phase IV — System Production and Operation

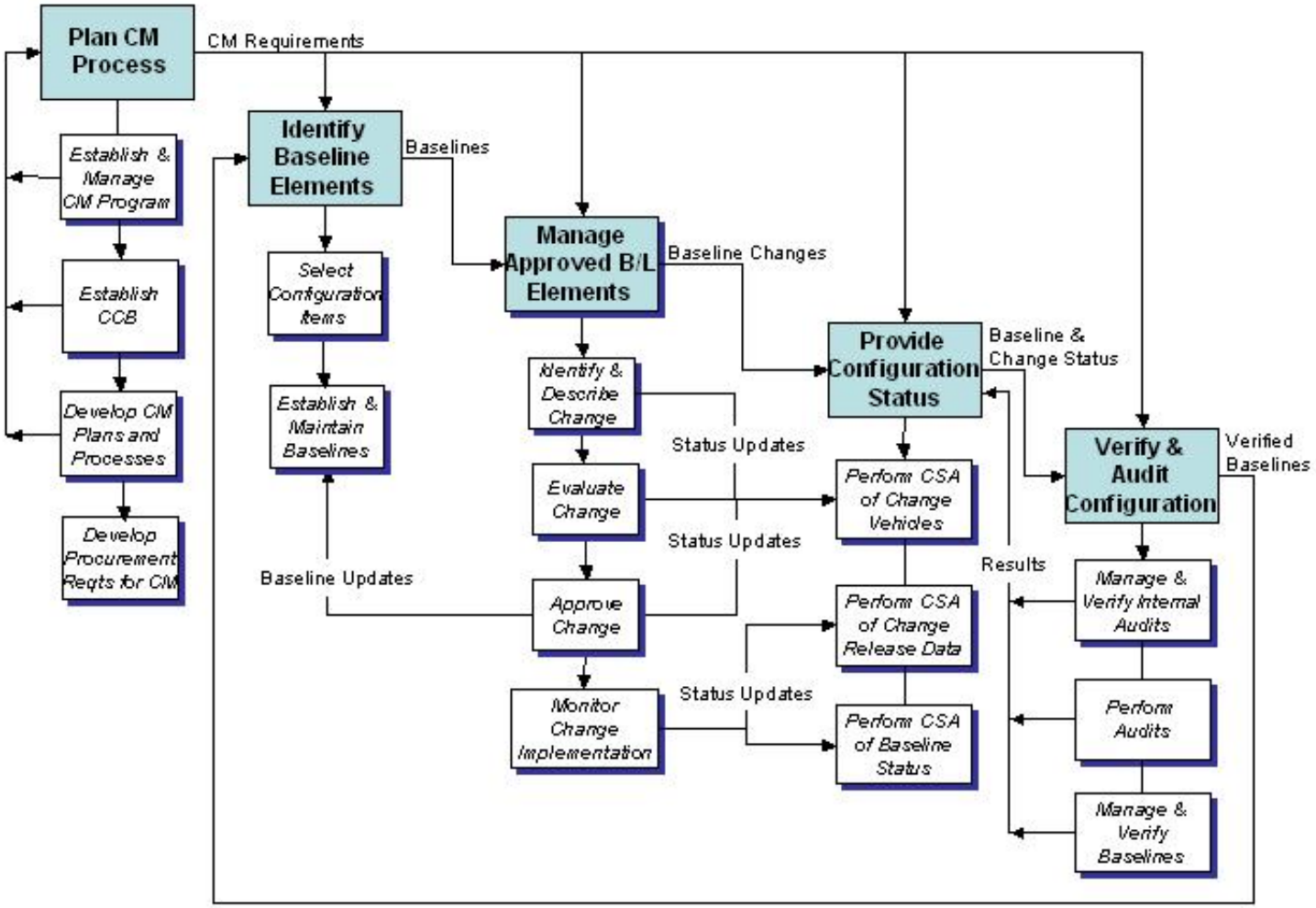
- System Production
- Supplier Production Activities
- Acceptance Testing
- System Distribution and Operation
- Operational Test and Evaluation
- Interim Contractor Support
- System Assessment
- System Operation in User Environment
- Maintenance and Logistics Support (M&OS)
- Operational Testing
- Systems Modifications
- Contractor Support
- System Assessment (Data Collection & Analysis)

↔ Production Baseline

→ Product Baseline (product confg)

Legend: Internal Project Baseline; Formal Baseline

High Level CM Process Overview



Configuration Identification Observations and Concerns

Configuration Identification Concerns

- **FAA STD-025 Compliance (i.e. Subsystem to Subsystem Interface Relationships)**
- **Verification of subsystem and component relationships in NAS-MD-001**
  - **Introduction of CIs at an appropriate level within MCI Hierarchy**
- **CI establishment and alignment across processes (CM, NASEA, FSEP, SSD)**

Reminders

- **Introduction of CIs & MCI Hierarchy:**
  - **Subsystem and Baseline Establishment/Maintenance**
    - **Baseline Documentation**
    - **Hardware**
    - **Software**
    - **Firmware**
  - **Review NAS-MD-001 on Regular Basis**
  - **Submit Casefiles/NCPS as appropriate (clear, accurate, complete, CI type declaration/hierarchy within the NAS)**
- **Ensure Appropriate DCC CCD Actions for Documentation Related NCPs**
- **Send Baseline Documents to DCC with Completed 1800-60 Form (Electronic Copy)**

Useful Web Pages

- **Agency CM Website:** http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/cm/
- **Agency CM Policy:** http://www.faa.gov/about/office_org/headquarters_offices/ato/service_units/techops/cm/cm_documentation/policy_180066/
- **FAST Toolset:** http://fast.faa.gov
- **AMS CM Requirements:** http://fasteditapp.faa.gov/ams/do_action?do_action=LinkSection&contentUID=4&sectionNumber=4.1
- **NAS-MD-001:** http://172.27.70.66/md001/mdmenu2.asp
- **CCB Charters:** http://www.faa.gov/cm/charters.htm
- **FAA System Engineering Manual:** http://www.faa.gov/asd/SystemEngineering/index.htm
- **WebCM Portal:** http://webcm.faa.gov
- **WebCM Step-By-Step Instructions:** http://webcm.faa.gov/webCMPortal/index.jsp?zaction=stepByStep
- **WebDOCCON:** http://172.27.70.90/
- **CM Point of Contact List:** http://caeg.faa.gov/Cm/index.cfm?current=10