2005 Technical Information Division Annual Conference, Miami, FL
3-4 March 2005

Configuration Management, Logistics, and Universal CM Issues by Mr. Larry Bauer, Boeing Commercial Airplanes
Transforming Logistics by Mr. Jerry Beck, OADUSD(LPP)

Configuration Management and Data Management in DODD 5000.1 by Dr. Jay Billings, President, Defense Systems Corporation

2005 CDM Certification and Apprentice Tutorial by Mr. Charles Billingsley

Industry Keynote - Adapting Logistics Capabilities to National Security Requirements by LTG Peter Cuviello, USA (Ret.)
Vice President and Managing Director,
Lockheed Martin Focused Logistics Enterprise

Integration of Systems Engineering & Supportability by Mr. Joe Grosson, Executive Director, Focused Logistics Enterprise & Corp.

Pre-Systems Acquisition Activities - Life Cycle Data Management in Handbook 859 by Ms. Cynthia C. Hauer,
Millennium Data Management, Incorporated

EIA-836 CM Data Exchange and Interoperability - CM Data to Support the Logistics Process by Mr. Alan Lager, MLR Associates

Army Aviation - Logistics For The Warfighter by Dr. Thomas Pieplow, Associate Director for Aviation, AMCOM


Military Engineering Data Asset Locator System (MEDALS) Data Quality by Mr. Warren M Scott, Program Manager, Military Engineering Data Assets Locator Systems (MEDALS), Defense Logistics Agency

IEEE 12207 “Software Life Cycle Processes”
Annual Symposium

Friday, March 4, 2005

7:30 a.m.  Registration & Coffee Service

8:30 a.m.  Session 2
Pre-Systems Acquisition – Handbook 859
Ms. Cynthia Hauer, President & CEO, Millennium Data Management, Inc.

EIA-836 CM Data Exchange & Interoperability; CM Data to Support the Logistics Process
Mr. Al Lager, MLR Associates

10:00 a.m.  Break

10:30 a.m.  Session 3
Industry CM Standards, Handbooks and Logistics Relationships
Mr. Larry Bauer, Boeing Commercial Airplanes

Military Engineering Data Assets Locator System
Mr. Warren Scott, Program Manager, Military Engineering Data Assets Locator System (MEDALS), Defense Logistics Agency, Battle Creek, Michigan

12:00 p.m.  Lunch (Stern’s Award) — LUNCH IS PROVIDED AS A PART OF YOUR REGISTRATION FEE

1:30 p.m.  Session 4: Production and Development
Configuration Management/Data Management in DoDD 5000.1
Mr. Jay Billings, President, Defense Systems Corporation

Mr. Gaston Ray, General Dynamics Advanced Information Systems

3:00 p.m.  Break

3:30 p.m.  Adjourn Meeting
Introduction for the Implementation of Software Configuration Management

I thought I knew it all!
IEEE 12207 “Software Life Cycle Processes”

History of 12207


IEEE/EIA 12207.0 – 1996: Software Life Cycle Processes


Abstract

ISO/IEC 12207 provides a common *framework for developing and managing software*. IEEE/EIA 12207.0 consists of the clarifications, additions, and changes accepted by the Institute of Electrical and Electronics Engineers (IEEE) and the Electronic Industries Alliance (EIA) as formulated by a joint project of the two organizations. IEEE/EIA 12207.0 contain **concepts and guidelines to foster better understanding and application of the standard**. Thus this standard provides industry a basis for software practices that would be useable for both national and international business.
IEEE 12207 “Software Life Cycle Processes”

• **Purpose:** This International Standard establishes a common framework for software life cycle processes, with well-defined terminology, that can be referenced by the software industry. It contains processes, activities, and tasks that are to be applied during the acquisition of a system that contains software, a stand-alone software product, and software service and during the supply, development, operation, and maintenance of software products. Software includes the software portion of firmware.

This International Standard also provides a process that **can be employed for defining, controlling, and improving software life cycle processes.**

• **Application:** Applies to the acquisition of systems and software products and services, to the supply, development, operation, and maintenance of software products, and to the software portion of firmware, whether performed internally or externally to an organization.
4. Application of this International Standard (Clause 4) (pg 6)

This clause presents the software life cycle that can be employed to acquire, supply, develop, operate, and maintain software products. The objective is to provide a road map for the users of this International Standard so that they can orient themselves in it and apply it judiciously.

4.1.1 Life Cycle Processes: This International Standard groups the activities that may be performed during the life cycle of software into five primary processes, eight supporting processes, and four organizational processes. Each life cycle process is divided into a set of activities; each activity is further divided into a set of tasks. Subclause numbering a.b denotes a process, a.b.c an activity, and a.b.c.d a task. These life cycle processes are introduced below in depicted in figure 1 (see pg 7).
IEEE 12207 “Software Life Cycle Processes”

5 PRIMARY LIFE CYCLE PROCESSES

5.1 Acquisition

5.2 Supply

5.3 Development

5.4 Operation

5.5 Maint.

8 SUPPORTING LIFE CYCLE PROCESSES

6.1 Documentation

6.2 Configuration Management

6.3 Quality Assurance

6.4 Verification

6.5 Validation

6.6 Joint Review

6.7 Audit

6.8 Problem Resolution

4 ORGANIZATIONAL LIFE CYCLE PROCESSES

7.1 Management

7.2. Infrastructure

7.3 Improvement

7.4. Training
5 Primary Life Cycle Processes (Clause 5) (pg 9):

This clause defines the following primary life cycle processes:

5.1 Acquisition process;
5.2 Supply process;
5.3 Development process;
5.4 Operation process;
5.5 Maintenance process.

The activities and tasks in a primary process are the responsibility of the organization initiating and performing that process. This organization ensures that the process is in existence and functional.
IEEE 12207 “Software Life Cycle Processes”

4.1.1.1 Primary Processes [task] (pg 6):

1) **Acquisition Process (subclause 5.1) [process]:** Defines the activities of the acquirer, the organization that acquires a system, software product or software service.

2) **Supply Process (subclause 5.2):** Defines the activities of the supplier, the organization that provides the system, software product or software service to the acquirer.

3) **Development Process (subclause 5.3):** Defines the activities of the developer, the organization that defines and develops the software product.
4) **Operation Process (subclause 5.4):** Defines the activities of the operator, the organization that provides the service of operating a computer system in its live environment for its users.

5) **Maintenance Process (subclause 5.5):** Defines the activities of the maintainers, the organization that provides the service of maintaining the software product; that is, managing modifications to the software product to keep it current and in operational fitness. This process includes the migration and retirement of the software product.
4.1.1.1 Primary Processes [task] (pg 6):

3) Development Process: Defines the activities of the developer, the organization that defines and develops the software product.

- Process Implementation
- System Requirements Analysis
- System Architectural Design
- Software Requirements Analysis
- Software Architectural Design
- Software Detailed Design
- Software Coding and Testing
- Software Integration
- Software Qualification Testing
- System Integration
- System Qualification Testing
- Software Installation
- Software Acceptance Support
5.3.11 System Qualification Testing. This activity consists of the following tasks, which the developer shall perform or support as required by the contract.

5.3.11.1. System qualification testing shall be conducted in accordance with the qualification requirements specified for the system. It shall be ensured that the implementation of each system requirement is tested for compliance and that the system is ready for delivery. The qualification testing results shall be documented.

5.3.11.2. The system shall be evaluated considering the criteria listed below. The results of the evaluations shall be documented.

   a) Test coverage of system requirements.
   b) Conformance to expected results.
   c) Feasibility of operation and maintenance.

5.3.11.3. The developer shall support audit(s) in accordance with 6.7. The results of the audit(s) shall be documented.

5.3.11.4. Upon successful completion of the audit(s), if conducted, the developer shall:

   a) Update and prepare the deliverable software product for Software Installation and Software Acceptance Support.
   b) Establish a baseline for the design and code of each software configuration item.
IEEE 12207 “Software Life Cycle Processes”

5 PRIMARY LIFE CYCLE PROCESSES

5.1 Acquisition
5.2 Supply
5.3 Development
5.4 Operation
5.5 Maint.

8 SUPPORTING LIFE CYCLE PROCESSES

6.1 Documentation
6.2 Configuration Management
6.3 Quality Assurance
6.4 Verification
6.5 Validation
6.6 Joint Review
6.7 Audit
6.8 Problem Resolution

4 ORGANIZATIONAL LIFE CYCLE PROCESSES

7.1 Management
7.2. Infrastructure
7.3 Improvement
7.4. Training
8 Supporting Life Cycle Processes (Clause 6) (pg. 27):

This clause defines the following supporting life cycle processes:

6.1 [a process] Documentation Process;
6.2 Configuration Management Process;
6.3 Quality Assurance Process;
6.4 Verification Process;
6.5 Validation Process;
6.6 Joint Review Process;
6.7 Audit Process;
6.8 Problem Resolution Process;
4.1.1.2 Supporting Life Cycle Processes (pg 6):

1) Documentation Process (subclause 6.1) [a process]. Defines the activities for recording the information produced by a life cycle process.

2) Configuration Management Process (subclause 6.2). Defines the configuration management activities.

3) Quality Assurance Process (subclause 6.3). Defines the activities for objectively assuring that the software products and processes are in conformance with their specified requirements and adhere to their established plans. Joint Reviews, Audits, Verification, and Validation may be used as techniques of Quality Assurance.
3) **Verification Process (subclause 6.4).** Defines the activities (for the acquirer, the supplier, or an independent party) for verifying the software products and services in varying dept depending on the software project.

4) **Validation Process (subclause 6.5).** Defines the activities (for the acquirer, the supplier, or an independent party) for validating the software products of the software project.

5) **Joint Review Process (subclause 6.6).** Defines the activities for evaluating the status and products of an activity. This process may be employed by any two parties, where one party (reviewing party) reviews another party (reviewed party) in a joint forum.
6) **Audit Process (subclause 6.7).** Defines that activities for determining compliance with the requirements, plans, and contract. This process may be employed by any two parties, where one party (auditing party) audits the software products or activities of another party (audited party).

7) **Problem Resolution Process (subclause 6.8).** Defines a process for analyzing and removing the problems (including nonconformances), whatever their nature or source, that are discovered during the execution of development, operation, maintenance, or other processes.
6.2 Configuration Management Process [a process] (pg. 29):

The Configuration Management Process is a process of applying administrative and technical procedures throughout the software life cycle to: Identify and define software items in a system; control modifications and releases of the items; record and report the status of the items and modification requests; ensure the completeness, consistency, and correctness of the items; and control storage, handling, and delivery of the items.

List of Activities:

6.2.1 Process Implementation [activity]. This activity consists of the following tasks:
6.2.1.1 A configuration management plan shall be developed [task]. The plan shall describe:

- The CM Activities;
- Procedures and Schedule for performing these activities;
- The organization(s) responsible for performing these activities;
- and their relationship with other organizations, such as software development or maintenance. The plan shall be documented and implemented.
6.2.2 Configuration Identification [activity]. This activity consists of the following tasks:

6.2.2.1 [task] A scheme shall be established for the identification of software items and their versions to be controlled for the project. For each software CI and its versions, the following shall be identified: the documentation that establishes the baseline; the version references; and other identification details.

6.2.3 Configuration Control. This activity consists of the following task:

6.2.3.1 The following shall be performed: identification and recording of change requests; analysis and evaluation of the changes; approval or disapproval of the request; and implementation, verification, and release of the modified software item. An audit trail shall exist, whereby each modification, the reason for the modification, and authorization of the modification can be traced. Control and audit of all accesses to the controlled software items that handle safety or security critical functions shall be performed.
6.2.4 Configuration Status Accounting. This activity consists of the following tasks:

6.2.4.1 Management records and status reports that show the status and history of controlled software items including baseline shall be prepared. Status reports shall include the number of changes for a project, latest software item versions, release identifiers, the number of releases, and comparisons of releases.

6.2.5 Configuration Evaluation. This activity consists of the following tasks:

6.2.5.1 The following shall be determined and ensured: the functional completeness of the software items against their requirements and the physical completeness of the software items (whether their design and code reflect an up-to-date technical description).
6.2.6 Release Management and Delivery. This activity consists of the following task:

6.2.6.1 The release and delivery of software products and documentation shall be formally controlled. Master copies of code and documentation shall be maintained for the life of the software product. The code and documentation that contain safety or security critical functions shall be handled, stored, packaged, and delivered in accordance with the policies of the organizations involved.
IEEE 12207 “Software Life Cycle Processes”

5 PRIMARY LIFE CYCLE PROCESSES

- 5.1 Acquisition
- 5.2 Supply
- 5.3 Development
- 5.4 Operation
- 5.5 Maint.

5 PRIMARY LIFE CYCLE PROCESSES

8 SUPPORTING LIFE CYCLE PROCESSES

- 6.1 Documentation
- 6.2 Configuration Management
- 6.3 Quality Assurance
- 6.4 Verification
- 6.5 Validation
- 6.6 Joint Review
- 6.7 Audit
- 6.8 Problem Resolution

4 ORGANIZATIONAL LIFE CYCLE PROCESSES

- 7.1 Management
- 7.2 Infrastructure
- 7.3 Improvement
- 7.4 Training
IEEE 12207 “Software Life Cycle Processes”

Four Organizational Processes (pg. 42):

The activities and tasks in an organizational process are the responsibility of the organization using that process. The organization ensures that the process is in existence and functional.

7.1 Management Process
7.2 Infrastructure Process
7.3 Improvement Process
7.4 Training Process
4.1.1.3 Organizational Life Cycle Processes (pg 8):

1) **Management Process (subclause 7.1)** [a process]. Defines the basic activities of the management, including project management, related to the execution of a life cycle process.

2) **Infrastructure Process (subclause 7.2)**. Defines the basic activities for establishing the underlying structure of a life cycle process.

3) **Improvement Process (subclause 7.3)**. Defines the basic activities that an organization (that is, acquirer, supplier, developer, operator, maintainer, or the manager of another process) performs for establishing, measuring, controlling, and improving its life cycle process.

4) **Training Process (subclause 7.4)**. Defines the activities for providing adequately trained personnel.
IEEE 12207 “Software Life Cycle Processes”

**SUMMARY**

IEEE/EIA 12207.0: Software Life Cycle Processes

- **Purpose:** This International Standard establishes a *common framework for software life cycle processes*, with well-defined terminology, that can be referenced by the software industry.

- **Application:** Applies to the acquisition of systems and software products and services, to the supply, development, operation, and maintenance of software products, and to the software portion of firmware, whether performed internally or externally to an organization.
IEEE 12207 “Software Life Cycle Processes”

A. Five Primary Processes

1. Acquisition Process
2. Supply Process
3. Development Process
4. Operation Process
5. Maintenance Process

B. Eight Supporting Processes

1. Documentation Process
2. Configuration Management Process
3. Quality Assurance Process
4. Verification Process
5. Validation Process
6. Joint Review Process
7. Audit Process
8. Problem Resolution Process
C. Four Organizational Processes

1. Management Process
2. Infrastructure Process
3. Improvement Process
4. Training Process
IEEE 12207 “Software Life Cycle Processes”

5 PRIMARY LIFE CYCLE PROCESSES

5.1 Acquisition
5.2 Supply
5.3 Development
5.4 Operation
5.5 Maintenance

8 SUPPORTING LIFE CYCLE PROCESSES

6.1 Documentation
6.2 Configuration Management
6.3 Quality Assurance
6.4 Verification
6.5 Validation
6.6 Joint Review
6.7 Audit
6.8 Problem Resolution

4 ORGANIZATIONAL LIFE CYCLE PROCESSES

7.1 Management
7.2 Infrastructure
7.3 Improvement
7.4 Training

Configuration Management, Logistics, and Universal CM Issues

Larry Bauer
Boeing Commercial Airplanes

NDIA Conference
Miami
March 4-5, 2005
larry.d.bauer@boeing.com
Configuration Management Standards Evolution


MIL-HDBK-61 → ISO-10007

ANSI/STDS → PLCS

ANSI/GEIA-649A-2004

GEIA-HB-649 (2005)
CM Overview

CM Functions per GEIA-649A

- **CM PLANNING & MANAGEMENT**
  - Selection, tailoring, guidance, oversight
- **CONFIGURATION IDENTIFICATION**
  - Attributes, identifiers, baselines
- **CONFIGURATION CHANGE MANAGEMENT**
  - Manage changes
- **CONFIGURATION VERIFICATION/AUDIT**
  - Verify performance & consistency
- **CONFIGURATION STATUS ACCOUNTING**
  - CM information & status
- **CM OF DIGITAL DATA**
  - Assure data integrity

Separate in 649; Merged in 649A
GEIA-HB-649 (DRAFT)
Implementation Guide for Configuration Management

- Handbook providing guidance for the implementation of a robust CM process regardless of:
  - product complexity,
  - size,
  - customer or
  - business objectives

- Provides advice and guidance for tailoring CM processes according to need and business requirements
Targeted for release 2\(^{nd}\) quarter 2005

NOT a replacement for MIL-HDBK-61
5 Functions of CM

- How do the 5 Functions of CM support Logistics?
- Planning and Management
- Identification
- Change Management
- Configuration Status Accounting
- Verification and Audit
CM Planning and Management

- To assure that the *appropriate CM processes, tools, and activities are applied*

- To establish CM *organizational responsibilities*

- To determine the necessary *resources and facilities*
CM Planning and Management (cont)

- To provide a basis for continuous improvement
- To enhance the maturity of the enterprises process
- To ensure data preservation and interoperability
Configuration Identification

- Determines **structure** of the product & documentation

- Defines **performance**, **interface** & other attributes

- Provides **unique identity** to product, components and documentation
Configuration Identification (cont)

- Prescribes *identification marking*

- Modifies *product and document identifiers* to reflect incorporation of major changes

- Maintains *release control and baseline definition*

- Provides *reference for changes & corrective actions*
Configuration Identification (cont)

- Correlates document revision level to product configuration
  - Enables user to distinguish between product versions
  - Enables service person to correlate product to instructions
  - Correlates units to warranty/service life
Configuration Change Management

- Enable change decisions to be based on knowledge of **complete change impact**
- Limit changes to those which are **necessary** or offer **significant benefit**
- Facilitate evaluation of cost, savings & trade-offs
Configuration Change Management (cont)

- Ensure **customer interests** are considered
- Provide **orderly communication** of change information
- Preserve configuration control at **product interfaces**
- Maintain and control a **current configuration baseline**
Configuration Change Management (cont)

- Maintain **consistency** between product and documentation

- Document and **limit variances**

- Facilitate continued **supportability of the product** after change
Configuration Status Accounting

- Enables retrieval of information concerning change decisions and change impacts

- Supports inquiries concerning future planning of design changes, investigation of design problems, warranties, shelf and operating life calculations, etc.

- Access to complete configuration information on a product, any individual product unit, or group of product units
Configuration Status Accounting

- Access to accurate identification of each delivered product unit

- Improves capability to identify, produce, inspect, deliver, operate, maintain, repair, and refurbish products

- Enhances availability of accurate information on spare parts and maintenance support

- Source for configuration history
Verification and Audit

- Ensure the product design provides the agreed to performance capabilities
- Validate the integrity of the configuration documentation
- Verify the consistency between a product and its configuration documentation
- Provide confidence in establishing a product baseline
Verification and Audit

- Ensure a known configuration as a basis for operation and maintenance instructions, training, spares and repair parts.

- Determine that an adequate process(es) is in place to provide continuing control of the configuration.

- Provides for continuous CM process improvement.
CM Support of Logistics

- Provides current identification of:
  - Items in inventory by location
  - Maintenance, Repair and Service Manuals and Records

- Provides Records of:
  - Repairs
  - Modifications
  - Removals
CM Support of Logistics (CONT)

- **Validates:**
  - Inventory
  - Location of items
  - Configuration of in-service and retired items

- **Supports:**
  - Location of needed Spares
  - Visibility of upgrades, qualified replacements, and authorized substitutions
Global CM and Universal CM Issues

- CM issues are common throughout industry and government
  - Supplier Management
  - Documentation Hierarchies
  - Efficient and Effective Change Management
  - Level of Rigor/intensity of CM processes in Product Development vs. Production
  - Control of Test/Development Configurations
Global CM and Universal CM Issues

- CM issues are common throughout industry and government
  - Tool selection and integration
  - Control of multiple Software versions
  - CM organization is popular after an accident or incident
  - Accurate repair history
  - Retrofit control
CM and Logistics - Summary

- Configuration Management provides logistics with accurate:
  - Configuration Identification
  - Configuration Change history
  - Inventory Management
  - Upgrade and Substitution visibility
  - Repair and Service records
  - Removal visibility
Technical Information Division Symposium
Achieving Knowledge-Enabled Logistics

Jerry Beck OADUSD(LPP) 3 March 2005
Near-Term Transformation Priorities (Joint Logistics Board)

- Implement meaningful and actionable metrics
- *Accelerate Performance-Based Logistics*
- *Develop a way ahead for Maintenance Excellence*
- Facilitate Distribution Process Owner success
- Streamline material flows
- Assess Customer Pay Opportunities
- Coordinate Logistics Enterprise Integration
- *Rationalize a corporate DoD Logistics vision into a coherent Transformation Roadmap - Focused Logistics*
Focused Logistics

- Rapid delivery of mission-ready forces
- Reduced inventory, smaller footprint, faster response
- Rapid distribution of tailored support packages
- End-to-end communications
- Total asset visibility
- Information fusion
- Logistics decision superiority

Bottom line: Forces in theater — whether forward-stationed or deployed — deliver more capability, require less support
Achieving Maintenance Excellence

Integrated, LEAN processes focused on weapon system readiness.
Autonomic Logistics System Provides an Affordable
Rapid Response Capability to the Warfighter
Automatically generates re-supply requirements information and provides platform health info...

Automatically feeds Army Shared Data Environment

Synchronized

Crew Display
Data Bus
Reasoner
Maintenance Aid
IETMs

Crew Status..Health
Ammunition Status - QTY by type
Embedded Diagnostics and Prognostics

Water Status
Supply Status

Specialized software and/or hardware (laptop)
To assist in maintenance management, troubleshooting, parts ordering, status

Software that integrates all the information to identify impending failure, order parts

Interactive Electronic Technical Manuals (software)
to troubleshoot, test, document, report

An installed part of the vehicle

Fuel Status
Automated Identification Technology

Fuel sensor

Automatic Generation of re-supply requirements information and provides platform health info...

Enterprise Resource Planning

STAMIS
GCSS-A Interface

Global Combat Support Systems Army

ERP

Standard Army Management Information

Army Stryker Vehicle
Integrated Weapon System Status and Health Management

Sensor-Based
Self Monitoring
Self Reporting
**Description:**
- On-board diagnostics and prognostics.
- Crash survivable cockpit voice and data recorder.
- Obtains real time vibration, rotor smoothing and aircraft health usage info.

**Background:**
- Successful HUMS demonstration on-going.
- Proposed cost funds UH-60M integration.

**Benefits:**
- Obtains real time vibration, rotor smoothing and aircraft health usage info.
- Supports predictive methods to allow replacement of parts prior to catastrophic failure.
- Reduces O&S costs.
- Improves readiness.
PBL is Performance-Based Life Cycle Product Support

PBL Guidance: A strategy for weapon system product support that employs the purchase of support as an integrated, affordable, performance package designed to optimize system readiness. It establishes performance goals for a weapon system through a support structure based on long-term performance agreements with clear lines of authority and responsibility to continuously meet the users needs.

- Functions That May Be the Responsibility of the Provider:
  - Obsolescence Management
  - Requirements Determination
  - Engineering and Technical Services
  - Configuration Management/Control
  - Technology Insertion
  - Transportation & Warehousing
  - Technical Data Management
  - Retrograde Management
  - FMS Support (If Applicable)
  - Public/Private Partnerships or Teaming
**PBL Weapon System Support**

- **Real-Time System Status**
- **Partnerships**: Visibility into cost/risk decisions across life cycle
- **Force Provider**: Provide continuous, reliable, affordable support per PBA
- **Industry/Government**: Buys Performance As a Package (Including Surge/Flexibility)
- **Weapon System Management**: Ensure system is sustained at optimum level per PBA
- **Acquisition**, **Sustainment**, **Disposal**: Visibility into cost/risk decisions across life cycle

**Diagram**

- PBA
- PM
- Partnership
- Force Provider

**Key Points**

- Continuous, reliable, affordable support
- Real-time system status
- Performance as a package
- Sustainment at optimum level
- Partnerships for visibility into cost/risk decisions
Technical Data Solutions to meet Network Centric Capability
Where Tech Data Must Fit with War Fighter Vision

Network Centric Global Command & Control System

Global Joint Integrating Concept (JIC)

GCCS Definition
Integrated Engagement Space
Critical operational capabilities identified
Global Combat Support System
How does Advanced Planning and Scheduling Fit in the Information Pyramid?

APS enables the transformation of data into business intelligence.

Business systems (legacy, MRPII, ERP) are transaction based, and much of the analysis that occurs in advanced planning and scheduling is above the transaction level of detail.

How do I transform data to decision support quality?
How does Advanced Planning and Scheduling Fit in the Solution Set?

Where does APS fit into my solution set framework?
APS Provides Business Intelligence to the Value Chain

Reliability Value Chain
- Design Engineering
- In-Service Engineering
- ECPs
- Modifications
- Service Life Extension

Response Value Chain
- Acquisition
- Procurement
- Maintenance Rpr, Overhaul
- Inventory
- Distribution

Material Availability
Operational Readiness

How does APS relate to the Material Readiness Value Chain?
The Impact of IDE

As JTAV is replaced by IDE AV, users, customers, and process owners will be provided timely and accurate information on the location, movement, status, and identity of units, personnel, equipment and supplies.

This facilitates the capability to act upon that information to improve overall performance of DoD’s logistics practices.

“Sense and Respond” Logistics
How Else Does IDE Contribute to Asset Visibility and Overall Interoperability?

Vision
The DOD Logistics Enterprise is executing practices, processes, applications, and decision support in an integrated logistics data environment, thereby achieving logistics data interoperability within a Net-Centric Community of Interest (COI).

TODAY
- Stovepipe Systems
- High Cost
- Limited Data Interoperability

TOMORROW
- Eliminate stovepipes
- Lower costs (reduced interfaces)
- Enable system-wide interoperability
Tasking from PPP Tiger Team

- Establish a Technical Data Subgroup to define a road ahead - Work with AIA - Begin Jan 05, report out 60 days thereafter - Opportunity Areas Identified

  - Technical Publications
  - Product Data Management
  - Professional Development
  - Technology Development
Tech Data Areas of Opportunity

I. Technical Publications: Expedite transition from paper to interactive electronic format

II. Product Data Management (PDM): Foster early integration of acquisition and sustainment data management systems into a “life cycle” system to improve reliability and decrease logistics footprint
Tech Data Areas of Opportunity

III. **Professional Development:** Ensure both developers and users of tech data understand their roles in contributing to sustained material readiness of systems

IV. **Technology Development:** Enable the inclusion of new technology initiatives into the tech data system
Implementation of S1000D

- New and Modified Weapon Systems
- Legacy Data
- Understanding End-User Needs
- Service Boundary Conditions
- Achieve Network Centric Logistics
- Sustainment of Data Systems
- Digital Technical Data Capability
Tasking for Maturing S1000D

Service / Industry / International Teams

- Complete Business Rules
- Identify Needs
- Identify Pilot to move toward Network Center Operations
TASKING

• Missions
  – RWCAS
  – Convoy Escort
  – Utility Support
  – Armed Recce
  – CASEVAC
  – Airfield QRF

• 24 / 7 Sustained operations

• Average % Day/Night
  – AH: 58.6 / 41.4
  – UH: 60.6 / 39.4

• FMC / MC (%)
  – AH: 61.0 / 70.7
  – UH: 55.0 / 60.0

“These old aircraft are surviving and succeeding on the backs of our maintenance Marines and at the risk of our aircrews lives.”
Objective

• Revise and Complete Electronic DoD Acquisition Guidebook by September 2004

• Electronically Link the Guidebook to Policy Documents (DAU)

Criteria

• This will be a Guide NOT A POLICY Document !!
• Explain, will not require
  – What and how vice shall and will
• Except when…(driven by 5000 policy)
• Relationship to other Guides and other Chapters
Overview of the Defense Acquisition Guidebook (11 Chapters)

- **Chapter 1, *Department of Defense Decision Support Systems***, an overview of the Defense Department’s decision support systems.

- **Chapter 2, *Defense Acquisition Program Goals and Strategy***, acquisition program goals and the topics the program manager should consider in developing a strategy for the acquisition program.

- **Chapter 3, *Affordability and Life-Cycle Resource Estimates***, acquisition program affordability and resource estimation.

- **Chapter 4, *Systems Engineering and Integrated System Design***, system design, and the systems engineering processes that aid the program manager in designing an integrated system to balance capability.

- **Chapter 5, *Life-Cycle Logistics***, provides the program manager with a description of Life-Cycle Logistics and its application throughout the system life cycle, from concept to disposal.

  *Chapters 4 & 5 are strongly linked*
Overview of the Defense Acquisition Guidebook *(Chapters 6-11)*

- **Chapter 6, *Human Systems Integration***, addresses the human systems elements of the systems engineering process.
- **Chapter 7, *Networks and Information Integration***, network-centric strategy to transform DoD warfighting, and intelligence capabilities.
- **Chapter 8, *Intelligence, Counterintelligence, and Security Support***, responsibilities regarding the prevention of inadvertent technology transfer, and guidance for the protection of those technologies.
- **Chapter 9, *Integrated Test and Evaluation***, integrated test and evaluation strategy to assess operational effectiveness and suitability.
- **Chapter 10, *Decisions, Assessments, and Periodic Reporting***, program manager and Milestone Decision Authority oversight responsibilities.
- **Chapter 11, *Program Management Activities***, activities and decisions required of the program manager, not discussed in earlier chapters.
Acquisition professionals should use this Guidebook to perform their management responsibilities.

Each chapter is designed to improve understanding of the acquisition process and ensure knowledge of the statutory and regulatory requirements associated with the process.

The Guidebook is more an electronic reference system than a “book”.

Hyperlinks let you electronically jump to related info.

Some links take you to external references, such as United States Code, or other formal DoD publications.

http://AKSS.DAU.MIL/DAG/
Under TLCSM the PM is responsible for Life Cycle Logistics (LCL), emphasizing LCL in systems engineering and implementing product support through Performance Based Logistics (PBL).
Discussion Topics

• How can we accelerate adoption of international standards to support net-centric operations and logistics?

• What is the appropriate role for industry and professional societies in standards adoption?

• Are current standards efforts sufficient to achieve net-centric operations and life cycle management?

• How can we better synchronize standards efforts with Allies?

*Will application of S1000D help DoD achieve Net Centric Focused logistics? Are there other alternatives?*
Summary

Government and Industry must work together to achieve this objective

- Framework has been established
- Performance based products
- Challenge to implement, must be cost effective
- Change is hard, but we owe it to the Warfighters to succeed

Meeting Warfighter needs Around the Clock, Around the Globe.
Potential Tech Data Solution Set

Goals: Better Faster Affordable

- Portal/Middleware/Web Service Access
- Business Intelligence Reusable Data Modules
- Interactive XML Database -- Repositories
- Structured XML Database -- Repositories
- Paper, Image and PDF Data Existing Source Data

- Viewing and Searching
  Conversion to S1000D with selective graphics
  Intelligent Graphics Class 4-5 IETM
  Low Cost Conversion to existing XML standards

Information Users

Potential Tech Data Solution Set

- 2 ½ - 3 ½ Per Page 98-100%
- 1 ½ - 2 ½ Per Page 90-95%
- 1 X Per Page 70-80% Usability
Potential Tech Data Solution Set

**Goals:** Better Faster Affordable

The Application Level provides the opportunity to leverage advancing technology without starting over and over and over.

Flexible business rules allow many different user communities to access the same set of data for disparate needs and newer needs can be met by evolution, not revolution.

Sophisticated XML can be limited to specific applications, increasing affordability and applying technology where it most benefits.

The Database can use a distributed architecture with a common composition, eliminating the need to force a single repository on the user community, and increasing the potential for success.

**Information Users**

- Portal/Middleware/Web Service Access
- Business Intelligence Reusable Data Modules
- Interactive XML Database -- Repositories
- Structured XML Database -- Repositories
- Paper, Image and PDF Data Existing Source Data

**Subjects Matter Experts**

- Subject Matter Experts
Where is CM and DM in DODD 5000.1

Presented 2-4 March 2005
Dr. Jay Billings
What is Dodd 5000.1

• The Federal Government uses a “gated decision” or milestone approach to management of large acquisitions
  – OMB Circular A-109
  – DoDD 5000.1

• Key elements are
  – Single point of authority and responsibility
  – Decisions made at major life cycle milestones
  – There are technical and budgetary milestones
    • Technical = feasible
    • Budgetary = affordable
What is the overall DODD Life Cycle Management Approach?

- The Defense Acquisition System exists to manage the Nation's investments in technologies, programs, and product support necessary to achieve the National Security Strategy and support the United States Armed Forces.
Overall View
Full Spectrum Analysis

**What**
- Threat
- Capability gaps
  - Present
  - Projected future
- Technology application

**Who**
- Doctrine
  - Strategy
  - Policy
  - Goals & Objectives
  - Plans & Procedures
- Organization
  - Ownership of Assets
  - Decision Authority
  - Command relationships
- Material
  - Comm. interfaces
- Training
  - Competencies
  - Knowledge
  - Skills
  - Abilities
  - New schools
  - Process
- Personnel, Facilities
  - Support Needs

**When**
- Programmatic
  - Milestones
  - Time frames
  - Deadlines
  - Deliverable dates
  - FOS Synchronization
  - P3I
  - Time phasing
  - Spiral acquisition
  - Spiral development
- Operational
  - Phases of campaign
  - IOC
  - Deployment process

**Where**
- Place on the battlefield
  - Mobility
  - Accessibility
  - Survivability
- Physical Environment
  - Facilities
  - Terrain
  - Weather & climate
- Theater specific considerations
- Supplies
  - Transportation
  - Deployment
  - Installation
  - Network
  - Maintenance
  - Civil considerations

**How**
- Doctrine
  - TTP
  - OPLANS
  - Military conditions
  - ROE
- Leadership
  - Decision Support
  - Information Mgmt
  - Deployment
- Material
  - Network
  - Design
  - Implementation
  - FOS Integration
  - Performance
- Personnel
  - Performance

Organization setting. Which organizations interface with the system? Address interfaces with other Joint Systems. Who will use the system when it is developed and fielded?

Time frames that will support acquisition approach. Milestones and/or dates to be delivered and fielded. Also consider phases of campaign.

The system’s place on the future battlefield. Consider physical environment.

Employment operation. How will the system be used to attain present and current future military objectives? Consider conditions under which the system will be used.

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Functional Area Analysis

Joint Operations Concepts

Joint Operating Concepts
Joint Functional Concepts
Integrated Architectures

Strategic Policy Guidance

Functional Needs Analysis

Materiel Changes
CJCSI 3170 process

Ideas for Materiel Approaches

Analysis of Materiel Approaches

DOTMLPF Changes
CJCSI 3180 Process

Alternative N
Alternative 2
Alternative 1

Post Independent Analysis

DOTMLPF Change Recommendation

CDD

ICD
Responsibilities

- Ensure new capabilities are conceived and developed in joint warfighting context
- Ensure JCIDS proposals are consistent with integrated joint force
- Validate Joint Impact proposals
- Organize, analyze & prioritize capabilities proposals
- Oversee development and update of Functional Concept(s)
- Ensure integrated architectures (as available) reflect functional area

Status

- 5 Chartered by JROC:
  - Command & Control (JFCOM);
  - Battlespace Awareness (J2);
  - Force Application (J8);
  - Focused Logistics (J4)
  - Protection (J8)

More Efficient Use of Scarce Department Resources
J CI DS Documents

- Capability Development Document (CDD)
  - **Replaces ORD at Milestone B**
  - Identifies operational performance attributes of proposed system
  - System specific, applies to single increment (in an evolutionary program)
  - Results from Technology Development and supports Milestone B
- Initial Capabilities Document (ICD)
  - **Replaces MNS**
  - Identifies a capability gap or other deficiency
  - Describes evaluation of DOTMLPF approaches
  - Support Analysis of Alternatives (AoA), Concept Refinement and Milestone A
  - Not updated once approved
- Updated or rewritten for subsequent increments

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JCIDS Documents (cont’d)

- Capability Production Document (CPD)
  - Replaces ORD at Milestone C and FRPDR
  - Identifies production attributes for a single increment of a program
  - Prepared during System Development and Demonstration
  - Rewritten for each increment in an evolutionary program

- Capstone Requirements Document (CRD)
  - No Near Term Change
  - Describes overarching thresholds/goals and standards in functional areas
  - Useful for family-of-systems or system-of-systems approaches
  - Developed only at JROC direction
  - Eventually will be replaced by integrated architectures
Increased Flexibility

- PM determines what information is required to satisfy regulatory requirements
- MDA may tailor (with some exceptions) regulatory information requirements
- MDA resolves issues regarding Guidebook expectations

The Opportunity to Be Innovative
Evolutionary Approach

Key Enablers

- Time-Phased Requirements
- A Modular Open Systems Approach to facilitate Technology Insertion
- Evolutionary Sustainment Strategies
- T&E Consistent with Evolutionary Approach
- Full Funding
System Integration

Enter: PM has technical solution but has not integrated subsystems into complete system; approved CDD
Activities:
- System Integration of demonstrated subsystems and components
- Reduction of integration risk
- DT/EOA/preliminary LFT&E
Exit: Demonstration of prototypes in relevant environment

System Demonstration

Enter: Prototypes demonstrated in intended environment
Activities:
- Complete system demonstration
- DT/OA/OT and preliminary LFT&E
Exit: System demonstration in intended environment using engineering development models; meets validated requirements
Each EA Increment Must Have...

- Milestone B & C
  - Capabilities Development & Production Document (CDD/CPD)
  - Performance, Cost and Schedule Goals (Acquisition Program Baseline)
  - Operational and Live Fire Testing (If Required)
  - Compliance with Acquisition Oversight Requirements
    - Acquisition Strategy that reflects consideration of:
      - Logistics Planning;
      - Manpower, Personnel and Training;
      - Environmental and Security Factors;
      - Protection of Critical Program Information;
      - Spectrum Management
      - Other information tailored to the conditions of the program

**Increments are Related, but Separate Acquisitions**

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Single Step & Evolutionary Approaches

Single Step

- NO CAPABILITY
- IOC
- FOC

Evolutionary

- Technology Base
- Requirements
- Capability

Initial Operationally Useful Capability

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Where do CM and DM appear?
The DoDD described system conflicts with Easy CM/DM

- Time-Phased Requirements
- A Modular Open Systems Approach to facilitate Technology Insertion
- Evolutionary Sustainment Strategies
- T&E Consistent with Evolutionary Approach
- Full Funding

- INSIDE CHANGE
- INSIDE CHANGE
- INSIDE CHANGE
- OUTSIDE CHANGE
- NEVER HAPPENS
• DoD 4120.24-M, the Defense Standardization Program (DSP)
  Policies and Procedures, there are only two classes of standards and specifications to be considered: those that may be used with no restrictions and those documents requiring waiver prior to application.
• Defense Standardization Program Policies and Procedures  Paragraph C3.8.2. of DoD 4120.24-M lists nine types of documents that may be used in development contracts. Of particular interest are three military document types: standard practices, interface standards, and defense standards.

Where is CM in DoDD 5000.1?
CM and DM are in Dodd 5000.1, but are subsets of other Systems Management Topics

- Technical Management
- Risk Management
- Interface Management
Standards

- ANSI/EIA 649A, Configuration Management, on the GEIA website (Click on STANDARDS);
- ISO 10007, Quality Management - Guidelines for Configuration Management;
- EIA 836, Configuration Management Data Exchange and Interoperability, located on the GEIA website (Click on STANDARDS); and
• ISO/IEC 15288, Systems Engineering-System Life Cycle Processes
• ANSI/EIA 632, Processes for Engineering a System
• IEEE 1220, Application and Management of the Systems Engineering Process
• EIA 731, Systems Engineering Capability Model
4.6.2. Handbooks and Guides

- *Guidance for the Use of Robust Engineering in Air Force Acquisition Programs*
- *Navy Systems Engineering Guide*
- INCOSSE Handbook
- MIL-HDB-61, *Configuration Management*
- MIL-HDBK 881, *Work Breakdown Structure*
- MIL-HDBK 1785, *Systems Security Engineering*
- NASA SE Handbook
- DSMC Systems Engineering Fundamentals
- DAU Risk Management Handbook
- *Product Support for the 21st Century: A Program Manager's Guide to Buying Performance*
- *Designing and Assessing Supportability in DoD Weapon Systems: A Guide to Increased Reliability and Reduced Logistics Footprint*
- *DoD Template for Application of Total Life Cycle Systems Management (TLCSM) and Performance Based Logistics (PBL) In the Weapon System Life Cycle*
- *DoD Guide for Uniquely Identifying Items*
- The Reliability Analysis Center is a DoD Information Analysis Center, a Center of Excellence, and a technical focal point for information, data, analysis, training and technical assistance in the engineering fields of Reliability, Maintainability, Supportability, and Quality. Their web site is [http://rac.alionscience.com/](http://rac.alionscience.com/)
Places where Standards CM and DM should be found

- Acquisition Strategy
- Product Support Strategy
- Statutory, Policy and Guidance Factors
- Acquisition Program Baseline
- Test Evaluation Master Plan
- WBS
• DoD 5000.1 and DoDI 5000.2 may not mention CM and DM specifically, but they do require several documents that allow for the application of CM and DM.

• This application is subject to tailoring and may be deleted, or incorrectly included.
• Why should we include CM and DM in DoD major acquisitions?
  – Makes sense to do it
  – They are fundamental management tools for systems management and for engineering management.
• Why exclude CM and DM from DoD major acquisitions?
• Why exclude?
  – They are alleged to “cost money”
  – They cause system to lose flexibility by forcing discipline too early
  – They do not allow for quick changes to reflect
    • mission changes
    • requirements changes
    • technology changes
    • they show responsibility and support accountability.
• Why include?
  – Increases knowledge
  – Avoids restarts and duplicative efforts
  – Assigns responsibility and accountability
Where it can be used

- Analysis of alternatives (Chapter 3 DoDI 5000.2)
- System Engineering Plan (Chapter 4 DoDI 5000.2)
- Test and Evaluation Master Plan (Chapter 9 DoDI 5000.2)
Why CM and DM

• How can CM and DM be “sold”?  
• One must describe the  
  – Features--  
  – Benefits--  
  – Proof
DM Standards

- **S1000D International Specification for Technical Publications Utilizing a Common Source Database**;

- **Data Management Community of Practice (CoP)**, located on the Acquisition Community Connection on the DAU website;

- **DoD 5010.12-M**, Procedures for the Acquisition and Management of Technical Data, May 1993;

- **DoD 5200.1-M** Acquisition System Protection Program, March 1994;

- **GEIA-859**, Consensus Standard for Data Management, located on the GEIA website (Click on STANDARDS). (Note: This document is currently being published.);

- **Intellectual Property: Navigating Through Commercial Waters, October 15, 2001**;

- **ISO 10303**, Standard for the Exchange of Product Model Data (STEP), website
The applied systems engineering process requires access to data to facilitate decision making, but does not necessarily require acquisition of all data. The data management processes assist in decision-making. Data management processes reveal the proper data to be acquired or accessed. The decision to purchase data should be made when access to required data is not sufficient to provide for Life-cycle planning and system maintenance. The cost of data delivery should be a primary consideration. Other considerations include the following:

- Data requirements for spare and repair parts;
- Technical data needed for ordering and purchasing items for contingencies; and
- Circumstances under which the data may evolve over time to more useful or updated data.
• **4.2.3.7.3. Data Storage**  The program manager also has responsibility for addressing long-term storage and retrieval of data and associated program information - planning for digitizing continued need information, as appropriate and cost-effective. Such long-term planning and incremental digitization, as required, will assure that applicable data is available, preserved, and migrated to successive formats for future planning and use.
DoDI 5000.2
DM Requirements

- Key Logistics activities that must be completed before MS B:
  - Preparation and/or assessment of sustainment planning and parameters in the
  - Capabilities Development Document (CDD)
  - Description of the product support strategy as documented in the Acquisition
  - Strategy (ASR)
  - Description of the appropriate logistics metrics, criteria, and funding
  - requirements in the Acquisition Program Baseline (APB).
  - Description of the appropriate logistics considerations and test points in the Test
  - and Evaluation Master Plan (TEMP)
The following LCL ‘drivers’ should be considered in the Initial Capabilities Document:

- System Maintenance/Support Profiles and Use Case Scenarios (Support Capability Packages)
- Reliability and Maintenance Rates
- Support Environment and Locations for Support
- Support and Maintenance Effectiveness
- Duration of Support
DoDI 5000.2
DM Requirements

• Cost Analysis
  – Lifecycle Cost Methodology
  – Models and Data
  – Cost Sensitivity and/or Risk Analysis

• Cost-Effectiveness Comparisons
  – Cost-Effectiveness Methodology
  – Displays or Presentation Formats
  – Criteria for Screening Alternatives

• Organization and Management
  – Study Team/Organization
  – AoA Review Process
  – Schedule
Case 1: Requirements
What are the major CM and DM issues for a requirement for “germ/virus resistant clothing”

- CM
  1
  2
  3
- DM
  1
  2
  3
What should be in your proposal for the Germ/Virus Resistant Clothing?

- CM
- DM

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What are good metrics to show that CM and DM is being used on a DoD Project/Program?
CDM Certification and Apprentice Tutorial
CDM Certification and Apprentice Tutorial

Introduction

- CDM Certification - Background
- Milestones
- The NDIA Process
- Other NDIA Certification Activities
- NDIA Program Strengths
- Recertification Program
- Conclusions

Questions?

Prepared by: Richard Thomas
Tel: 719 689 5851
E mail: rctenterprises@aol.com

Presented by: Charles Billingsley

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CDM Certification and Apprentice Tutorial

Background

- Certification initiated in 1990 by ADPA (the predecessor association to NDIA)
- Modeled after successful certification programs in medical professions, and other disciplines such as logistics, quality, contract management, etc.
- Common aspect among all viable programs is their insistence that high levels of professional competence result from two sources: Knowledge and Experience.
Knowledge can be gained in several ways; formal education, seminars, self study, job assignments, on-the-job training, etc.

HOWEVER

Experience can only be gained by actual performance
This is why recognized and respected certification programs in any discipline require individuals to demonstrate their knowledge, and possess the needed experience to become certified. For example, to become board certified as a surgeon one must have performed successful surgery of the specified type for the required number of times; and separately demonstrate their knowledge.
CDM Certification and Apprentice Tutorial

Milestones

◆ 1990: ADPA sponsors Technical Information Division CM and DM certification
◆ 1990: Limited ‘Grandfather’ CM and DM Certification initiated, based on experience
◆ 1991 - 1995: Certification by examination offered separately in CM and DM disciplines at Manager and Specialist levels; exams based primarily on DoD methodology
1996: Separate CM and DM Certifications combined into one CDM Certification

1996 on: Exams based on prevalent Industry, International and government standards; Exams modified to emphasize essay questions in addition to objective questions

1997: ADPA/NSIA merge to become NDIA

2000: NDIA International CDM Certification initiated with first exams in United Kingdom
NDIA Process

- NDIA Certification requires that applicants meet the following requirements:
  1. Pay fee;
  2. Submit CDM experience resume;
  3. Demonstrate CDM knowledge on exam.

- This process requires significant effort by the candidate.

- Examination is not difficult, but the CDM discipline is broad, and candidates need to prepare and apply themselves.
CDM Certification and Apprentice Tutorial

- Following charts focus on CDM Certification; but also apply to the CDM Apprentice program.
- The significant difference is that the Apprentice only requires a minimum level of experience.
- The Apprentice exam is much easier even though the subject matter is the same.
CDM Certification and Apprentice Tutorial

NDIA Process

2005 Fee Structure

◆ Examination fee: $250.00

◆ Required one year NDIA individual membership: $30.00

◆ Examination retake fee (if needed): $100.00 (Valid for 24 months from date of first exam)
CDM Certification and Apprentice Tutorial
NDIA Process

Provide CDM Experience Resume

Requirements:
- Apprentice: about 1 Year CDM Experience
- Specialist Certification: 5 Years CDM Experience
- Manager Certification: 10 Years CDM Experience

Applicants document in a resume their combined CM and DM activities during various work assignments.

Resume reviewed, and verified (as appropriate) by two Technical Information Division certified board members.
Demonstrating Knowledge: The Examination

- **Basic philosophy:** examination attempts to determine an individual’s knowledge, **Not** their ability to memorize references
- Includes questions on hardware, software and many data management subjects
- Administered in four parts, each with defined subject matter
- Questions in essay and objective formats
CDM Certification and Apprentice Tutorial

NDIA Process

Demonstrating Knowledge: The Examination

- Exam envelope: 8:00 AM to 4:30 PM, with between parts and lunch breaks
- No reference materials may be used
- Administered only by TID Certified board members who are responsible for security and integrity of the examination
- Passing score: 70% (achieve 280 of the maximum 400 points)
CDM Certification and Apprentice Tutorial

NDIA Process

Demonstrating Knowledge: The Examination

- Scoring performed by *volunteer* Scoring Teams (6 or more NDIA certified individuals)
- Team has *complete scoring authority*, including the ability to ‘throw-out’ questions judged inappropriate or invalid

- **Objective questions**: Scored using the TID consensus scoring key
- **Essay questions**: Scored independently and subjectively by three team members with final score assigned by team lead
CDM Certification and Apprentice Tutorial

NDIA Process
The Certification Award

- Certifications are signed by NDIA Director of Operations, TID Chair, and TID Certification Section Chair
- NDIA Director of Operations congratulatory letter accompanies each certification
- Name of each person certified annually printed in *National Defense* magazine
- Name of all certified individuals entered in the ‘Book of Honor’ at NDIA HQ
CDM Certification and Apprentice Tutorial

Other Certification Activities

Certification/Apprentice Preparation Course

- A preparation course is presented annually at various conferences (GEIA, ACDM)
- Course also presented upon request by companies or groups of individuals
- Provided by NDIA because many applicants report their organization has no training designed to help prepare the staff for Certification or Apprentice
CDM Certification and Apprentice Tutorial

Other Activities

Promoting the NDIA CDM Certification and Apprentice Programs

- Publication of promotional documents
- Advertising in selected publications
- Certification and Apprentice Study Guides
- Examination schedules
- Briefing organizations and companies interested in the program
CDM Certification and Apprentice Tutorial

Program Strengths

- NDIA Certification is widely recognized as the industry leader; and is the single CDM certification adhering to high standards maintained by other successful programs (i.e. maintaining the requirement that candidates must):
  - Meet established experience levels
  - Successfully Demonstrate CDM knowledge by passing the examination
Because of these standards:

- those who earn NDIA Certified Configuration and Data Manager (CCDM) or NDIA Certified Configuration and Data Specialist (CCDS) are recognized as *professionals* within the discipline.

- Those who earn NDIA CDM Apprentice level are recognized as serious individuals on their way toward CDM professional status when they have required experience to apply for Certification.
Program Strengths (Cont’d)

- NDIA Certification has been developed over time by hundreds of experienced and respected CDM professionals, many of whom continue to provide guidance and support.

- The examination always reflects current trends in CDM, and is based on the most prevalently used industry, international, and government guidance documents.
Program Strengths (Cont’d)

- Examination focus is on practical, real world CDM subjects using both objective and essay type questions
- No reference document memorization is needed (or recommended)
- Many exam questions may be successfully addressed based on an individual’s CDM experience
A ‘Re-certification’ program was initiated in January 2003; it provides a method to be recertified five years after the original certification, for the following reasons:

- Rapidly changing CDM applications and guidance stds. require current knowledge
- To enhance the quality of CDM participants by eliminating those who have chosen to leave active participation in the discipline
Re-Certification Program (Cont’d)

- Re-certification may be applied for and accomplished by:
  - (1) Retaking the examination
  - or
  - (2) Documenting the following:
    - Completing recognized CDM training courses
    - Conducting CDM training courses
    - Continuing activity in a CDM job
    - Participation in conferences with CDM focus
CDM Certification and Apprentice Tutorial

Re-Certification Program (Cont’d)

- TID board members review and evaluate applications and submitted documentation
- Upon approval, a re-certification is issued valid for an additional five years
- There is an NDIA fee of $200.00, if membership is current
- Those choosing not to be re-certified still retain their prior certification; however, it is considered a “non-current” certification
CDM Certification and Apprentice Tutorial

Recertification Program (Cont’d)

- All NDIA certifications issued subsequent to 1 January 2003 have expiration dates five years from date of issue (date of exam)
- Complete information is at: ndia.org (see Recertification Plan)

or contact

- Dick Thomas or any TID Board Member
Conclusions

Program success has surpassed expectations and resulted in the following:

- As of 1 January 2005, over 1500 CDM professionals have earned NDIA Certification, and 29 have earned NDIA CDM Apprentice status.
- These NDIA Certified individuals provide a quality base within the discipline that enhances the CDM professional environment for all practitioners.
NDIA
21st Annual National Logistics Conference

Adapting Logistics Capabilities to National Security Requirements

Industry Keynote
LTG Peter Cuviello, USA (Ret.)
Vice President and Managing Director
Lockheed Martin Focused Logistics Enterprise

1 March 2005
Agenda

• A Walk through History
• What we can learn from the past
• Thoughts on logistics transformation
The Origin of Logistics

• From the Greek word “logistikos” – meaning “skilled in calculating”

• Originally used in Roman and Byzantine times when there was a military administrative official with the title “Logists”.

• The word implied a skill in the sciences of mathematical computations.
Historical Perspective

When US Logistics Started

• By resolution in 1775 the Continental Congress provided for a staff to administer aspects of its military establishment. On 16 June legislation was passed authorizing an Adjutant General, a Commissary General of Stores and Provisions, Quartermaster General, among others.

• The First TRANSCOM: The greatest responsibility of the quartermaster general was to provide transportation but also had other duties related to the procurement and distribution of supplies.
The beginning of the Defense Industrial Base

• 1639 ~ manufacture of gunpowder
  – Massachusetts Bay colony
• 1647 ~ Cannon cast in Lynn, Mass
  – and Bridgewater, Conn in 1648
• 1680 ~ powder mill at Dorchester

• After British prohibited in 1774 the export of firearms to the colonies, Massachusetts established a public arms factory.
  – Virginia established a plant at Rappahonnock Forge near Fredericksburg
  – 1775, Pennsylvania established a gunlock factory in Philadelphia. In the winter of 1775-76 Pennsylvania arms makers manufactured more than 4,000 muskets.
Historical Perspective, War of 1812

The Defense Industrial Base Grows with both Public Arsenels and Private Industry

• 1812, Eli Whitney accepts contract for the manufacture of muskets in Conn and New York but wanted a 20 year period to amortize the cost of tooling that was necessary to improve reliability
• Production of muskets at the national armories increased steadily from 1808 to 1812, at Springfield and Harper’s Ferry

• 1840-1850s ~ defense contracting evolves

Defense Industrial Base continues to grow with a number of Private Industry suppliers providing rifles, pistols and swords.

Because the US Government is virtually the only customer the practice of renewable long term contracts is successfully implemented for those providers of quality products offered at competitive prices. ~ Whitney of Conn.; Pomeroy of Pittsfield Mass; Derringer of Phila.
**Revolution.** General Washington continually handicapped by lack of munitions, supplies and transportation. The situation was improved by aid from France.

**Civil War.** The Confederate army was hindered and never succeeded in overcoming its supply deficiencies even with some small arms and fabric from the UK and support from France late in the war.

**WW I.** The US Army could not have played the decisive role without weapons, munitions, supplies and transportation furnished by allies.

**OIF.** US forces were reliant on coalition and friendly allied support for water, fruits and vegetables and batteries, among other things.
Historical Perspective, Revolutionary War

- Burgoyne’s Surrender at Saratoga.
  - Breakdown of his transportation
  - Failure of procurement in Canada
  - Failure of procurement en route
  - Delays that gave the Americans time to reorganize

- What Borgoyne considered essential in numbers of men and artillery and baggage proved to be only a burden against success.

- In moving heavy ordinance and stores he lost one of the most important elements in warfare - timing

- For the Americans, lines of communication remained open, resupply generally was adequate, and troops were sufficiently well re-equipped
Historical Perspective, Civil War Logistics and Missed Opportunities

1st Manassas: If Confederate forces had logistics support they could have pursued Federal Forces all the way to Washington.

Peninsular Campaign, Spring 1862, McClellan moved 110,000 men and supplies employing 400 steamers and sailing vessels, 14,500 animals and 44 batteries of artillery.

Antietam: Logistics provides an opportunity, not exploited ~ because of an extraordinary use of the railroads for resupply, McClellan was provided the means to renew the attack and gain a decisive victory over Lee’s forces. In Sept 1862, it could have been over.

Gettysburg: The Union Victory at Gettysburg can be ascribed to an immense logistical advantage through use of railroads to bring up supplies and men to General Meade. The federal side had enough supplies to continue the battle for days. Even without the Confederate’s “tactical errors” they could not have been able to sustain the campaign for a decisive victory over the Union Army.
“A situation as shocking to the War Department as it was embarrassing to the Services of Supply in the European theater developed when it became necessary to reorder large quantities of Class II {clothing and weapons} and IV {construction and fortification} supplies that were knowns to be already in the United Kingdom but which, because of faulty marking and lack of proper records, could not be found in time to equip the forces preparing to sail from Britain.

It hardly helped matters when requisitions arrived without proper identification and when timely status of supply reports were lacking.”
The Classical Principles of Logistics Continue to Apply

• First with the most
• Equivalence
• Materiel Precedence
• Economy
• Flexibility and Dispersion
• Feasibility
• Timing
• Unity of Command
• Knowledge through Information
GAO Report on OIF

“A backlog of hundreds of pallets and containers of materiel at various distribution points due to transportation constraints and inadequate asset visibility.”

“A discrepancy of $1.2 billion between the amount of materiel shipped to Army activities in the theater of operations and the amount of materiel that those activities acknowledged they received.”

“A potential cost to DOD of millions of dollars for late fees on leased containers or replacement of DOD-owned containers due to distribution backlogs or losses.”

“The cannibalization of vehicles and potential reduction of equipment readiness due to the unavailability of parts that either were not in DOD’s inventory or could not be located because of inadequate asset visibility.”
“The duplication of many requisitions and circumvention of the supply system as a result of inadequate asset visibility.”

The accumulation at the theater distribution center in Kuwait of hundreds of pallets, containers, and boxes of excess supplies and equipment that were shipped from units redeploying from Iraq without required content descriptions and shipping documentation.

“DOD did not have adequate visibility over all equipment and supplies transported to, within, and from the theater of operations in support of OIF.”

“DOD did not have a sufficient distribution capability in the theater to effectively manage and transport the large amount of supplies and equipment deployed during OIF.”
“The failure to effectively apply lessons learned from Operations Desert Shield and Desert Storm and other military operations may have contributed to the logistics support problems encountered during OIF.”

“At times there were shortages of some spares or repair parts needed by deployed forces.

“Army pre-positioned equipment used for OIF was not adequately configured to match unit needs.
“DOD contractors used for logistics support during OIF were not always effective.

“Physical security at ports and other distribution points in the theater was not always adequate to protect assets from being lost or taken by unauthorized personnel.
For Logistics the Battle is the Pay-off.

Beyond the procurement of military supplies and equipment there remain the closely related activities of storage, distribution and transportation to get materiel into the hands of the troops and to all the battle areas*

*The Sinews of War, Army Logistics 1775-1953, Office of the Chief of Military History, United States Army
The most elegant element of logistics transformation is the design of logistics solutions into the weapon system itself

• Designing systems for maintenance free operation

• Use of autonomic solutions employing prognostics and health management

• Different ways of thinking about managing obsolescence through technology refresh strategies

• Performance Based Logistics Business strategies, for system level total sustainment, where long term contracts and tailored incentives force lean principles and continuous improvement in system level availability and TOC reduction
Concluding Comments

- Elegance of engineering solutions
- Courage to employ new business models
- Integration of logistics into the overall command and control so that we truly achieve equivalence as the classical principle states:

Strategy, tactics and logistics, as history has proven, is what wins wars.
“The line between disorder and order lies in logistics…”

...Sun Tzu

“My logisticians are a humorless lot ... they know if my campaign fails, they are the first ones I will slay.”

...Alexander

“There is nothing more common than to find considerations of supply affecting the strategic lines of a campaign and a war.”

...Carl von Clausevitz

“Logistics comprises the means and arrangements which work out the plans of strategy and tactics. Strategy decides where to act; logistics brings the troops to this point.”

...Jomini: Precis de l' Art de la Guerre. (1838)

“Gentlemen, the officer who doesn't know his communications and supply as well as his tactics is totally useless.”

...Gen. George S. Patton, USA

“The war has been variously termed a war of production and a war of machines. Whatever else it is, so far as the United States is concerned, it is a war of logistics.”

...Fleet ADM Ernest J. King, in a 1946 report to the Secretary of the Navy

“Bitter experience in war has taught the maxim that the art of war is the art of the logistically feasible.”

...ADM Hyman Rickover, USN

“Forget logistics, you lose.”

...Lt. Gen. Fredrick Franks, USA, 7th Corps Commander, Desert Storm
Overview of the LM Sustainment Business Base

C2 of DoD
Distribution & Transportation

Delivery of Warfighter Capability ~ Present
LM Business Base ($5B+)

C4ISR
COCOM
Control of
Warfighter Capability

Logistics Command & Control
e.g. GCSS, GTN, AF Knowledge System,
AF NIPRNET/SIPRNET Portal, ILS-S, FIRST,
Maint. Training, ERP Study, Navy Log EA,
AF Enterprise COTS Integration, C2 Constellation, MARCOR AL

DOD Enterprise System Implementation
e.g. DLA BSM, JEDMICS, DMS, JLACTD

Performance Based Logistics, Prime Vendor,
TSSR, SCM, System Support and Maintenance

MS2
• MK 41
• AEGIS
• ARCI
• A/C Tires
• Trident Nav
• Q70 CDVD
• BSY-2 POSS
• Va.Class NPES

M&FC
• HIMARS
• JAVELIN
• F-14 LANTIRN
• Apache TADS/PVNS

LMSI
• H-60 TTT
• H-60 Avionics
• Merlin

Aero
• JSF
• F-16
• F-117 TSPR

Space
• THAAD
• TRIDENT MSL

LMSM
• Log. Support Services
• WIN T Log

ISS
• AF OSI Maintenance
• USMC Auto Log

New Acq. Prog. Pursuits
• MMA
• LCS
• MUOS
Total systems support from design to disposal (D2D)

Supply Support
- Depot Management
- Requisition Processing
- Supply Chain Management
- Transportation & Distribution
- Stock Point Functions
- Modeling and Forecasting
- Repair & Return

Installation & Maintenance
- Remote Condition Monitoring
- Work order generation
- Fault response monitoring
- Installed base maintenance (RCM, CBM)
- Documentation Updates
- System Grooming
- Distance Support to Field Operators & Maintainers
- Asset data collection
- Data base maintenance

Single Point Accountability

Program Management
- Strategic planning
- System Upgrade & Major Maintenance Schedules
- Cost Baselines
- Ownership Cost Reduction
- Contracting Services for:
  - Maintenance
  - Support services
  - Upgrades
  - Major System Overhaul
- Schedule Baselines
- Technology Insertion Development Schedules
- Subsystem Upgrade Schedules

Supportability Engineering
- Technology Refresh & Insertion
- Configuration Management
- Baseline Mgmt. - Functional, Physical
- Design for Supportability
- Safety Engineering
- Test Planning
- Test, Validation & Verification of Technology Refresh/Insertion
- Software Maintenance
- Hardware Maintenance
- Commonality Analysis

Training
- New Operators & Maintainers
- Workforce
  - Management
  - Technical
  - Operational
  - Compliance
- Refresher and Update training
- Curriculum Updates

End State: Integration of Systems Engineering & Supportability
For the life of the system
Planning, Concept Development, Business Model

- Requirements Modeling and Simulation
- Sustainment Strategy
- Concept of Operations
- Business Model and Performance Metrics
- Public Partnerships & Subcontracting
- Capital Investment in Sustainment Infrastructure

Engineering & Design For:
- Reliability
- Maintainability
- Affordability
- Manufacture & Production
- Testability
- Minimum footprint
- Power, space, fuel, Weight, moment
- Security and Exploitation
- Human Factors
- Obsolescence & Tech Refresh
- System Interface Integration

Functional Activities
- IT Infrastructure
- SCM/ITV/TAV
- Training, Training Facilities, simulators
- Repair & Return
- Maintenance
  - Hardware, Software
  - CSS
- Tech Doc
- PDM
- Parts Inventory
- Depot Operations
- Manpower: Operations, Maintenance, Training
- Transportation/Distribution
- Customer Support/CRM
- Prog. Mgmt & Control
- Support Equipment

External to Program Boundary

Cross Program Implications
- Common Items, e.g. Processors, Power supplies
- Software, Applications & Middleware
- Engineering Devel. & Test Facilities
- Simulation
- Tools & Processes
- Shared ERP
- Shared Training Facilities
- IR&D & Investment
- Standard Materials
- T&E
- Disposal & Reuse

In the Trade-Space Domain, ALL Elements are Mutually Inclusive
Maintenance Free Operating Period (MFOP) - Wedge of Opportunity

- MFOP - Eliminates maintenance and the need for associated support while aligning logistics actions with preplanned COTS Technology Refresh and Insertion for improved Operational Availability.

Impact of COTS
- Less Design
- Less Schedule
- Modularity & Scalability

Traditional source of the lion's share of system cost

Logistics Savings
- Tech Refresh
- Training
- Maintenance
- Supply Support

MFOP Savings Opportunity

Cumulative Life-Cycle Costs Incurred by the Program/System

$ 20-35 Years
Autonomous & Intelligent Design to Disposal Management & Control of Maintenance, Engineering, CM, Training, Field & Distance Support, Supplier/Repair, Warehouse, Inventory, Transportation, PHM, Government Interfaces & Portals
Design for Supportability
The Technology/Time Baseline

• Technology Migrations

Platform
1/3 of Fleet
1/3 of Fleet
1/3 of Fleet

Technologies
RF
Fiber Optics
Signal Processing
Data Processing
Display
Networking
Operating Systems

Contract Award First Platform Available for Testing
Systems Integration:
6 - Major Elements to Systems Integration

- System Architecture
- Operational Assessment
- Cost Analysis
- Supportability/Logistics
- Skills, Facilities
- Teamwork
Systems Integration: Managing Operational Effectiveness

• Focus on Mission Success and the Impacts of Multi-Platform Operations
• Transition from Operational Shortfall to Performance Requirements
  • Involve End-User in Defining System Performance Requirements
• Push Advanced Technologies to the Fleet
• Assess What is Achievable at an Affordable Cost & Acceptable Risk
• System/Subsystem Interface Requirements
  • Identifying Standards and Their Migration
  • Maintaining an Open Architecture to Facilitate Future Enhancements
• Leverage State-Of-The-Practice Technologies and Standards for Military Use
• Determine Impacts to Currently Fielded Platforms/Systems
• Develop Implementation Schedules that Optimizes LCC
• Assess Architectures from a Supportability Perspective
Systems Integration:  
Cost Analysis

- Integrate LCC into the System Engineering Process
  - System Engineering “Trade-Space” Must Be Constrained By Cost
- Understand the Drivers
  - Internal/External Infrastructure
  - Improved Performance
  - Technology Obsolescence
  - Support/Maintenance/Manpower
- Focus on Total Ownership Cost Not Just Development and Acquisition
  - Fleet Support
  - Training
  - Contractor Infrastructure Costs
- Sub-Tier Competition
Systems Integration:
Supportability Engineering and Logistics Planning

- Supply Support
  - Spares Management/Optimization
  - IT Leverage to Supply Chain Management
  - Physical Commonality
  - Coordinate Technology Refresh with Spares Requirements
  - COTS Maintenance Agreements

- Training and Trainers
  - Operational Commonality to Reduce Skill Level Requirements
  - Embedded, Portable, Adaptable, Distance Training
  - Multi-Media Leverage to Training

- Platform/System Documentation Requirements
  - Multi-Media Leverage to Documentation

- Facilities
  - Prototype Laboratory
  - Total Asset Visibility/CM
Supportability

Better Integration of Supportability Engineering into Design

Innovative Quantifiable Metrics
Innovative Models and Best Practices
Integrated Design/Data Environment

Network Centric Logistics Planning
Maintenance Concept/Infrastructure
Logistics Information Management

Proactive Demand Forecasting and Responding to Logistics Requirements
System Integration:
The Total Sustainment Approach - Benefits

• **To The Customer**
  – Reduced Total Ownership Costs (TOC)
    • Leveraging Commonality
    • Executing Technology Refreshment
    • Exploiting Commercial OEM Support Infrastructure
  – System Infrastructure Performance Improvements
    Facilitate Functional Upgrades
  – Elimination of Obsolescence
  – Guaranteed Operational Availability

• **To Industry**
  – Strategic Discriminator as a System Integrator
  – Expanded Business Base
    • Technology Refresh and Insertion Planning
    • Management of Spares, Spares Inventory, and Repairs
  – Uniform Resource Planning - Eliminates Large Shifts in the Manning Profile to Re-Design for Obsolescence
Total System Sustainment Enablers

• Primarily through Implementation of the Systems Integration Approach

• Leveraged by business and engineering approaches
  – Effective Public-Private Partnerships
  – Performance-By-the-Hour™ Contracts ~ The Incentive for Industry to Reduce TOC, Which In Turn Results In:
    • MFOP ~ Maintenance Free Operating Period Design
    • Employing Use of PHM: Prognostics and Health Management
    • Web-Enabled Distance Support (e.g., NavalSupport.com) and Distance Training
    • Autonomic Supply Chain Management and JIT Support

An Integrated Solution Set for Full Service Support
Pre-Systems Acquisition Activities

Life Cycle Data Management in Handbook 859

Presented Friday, 4 March 2005
NDIA TID CDM Symposium
Miami, Florida

Cynthia C. Hauer
Millennium Data Management, Incorporated
Huntsville, Alabama
Defense Acquisition Management Framework
“Enabling Logistics for the 21st Century”

User Needs and Technology Opportunities

Where Should DM Begin?

Where does DM usually “begin”?
Defense Acquisition Management Framework
“Enabling Logistics for the 21st Century”

User Needs and Technology Opportunities

Answer: Way Too Late!

Concept Refinement
Technology Development
System Development and Demonstration
Production & Deployment
Operations & Support

Pre-Systems Acquisition
Systems Acquisition
Sustainment

Concept Design Review
Design Readiness Review
FRP Design Review
Why is that?

- Usual answers ... and questions that I wish I could ask!
  - “too intrusive”
    - Really? How is it that documenting decisions and good planning are problems for you?
  - “too expensive”
    - We invest < 1-3% of total program dollars in DM, on a good day
  - “too soon”
    - And you wanted to wait until when?? Oh, yeah, right after the disaster!
  - “we’re not in production, yet”
    - No, and it’s highly likely that you won’t get there without better management of your process and your program!
    - And if you do, how are you going to know what you did to get to production?
  - “we haven’t made up our minds what we want to do, yet”
    - Don’t you need some traceability for your decisions and your requirements, as they evolve? Is this really an ad hoc program?
    - Don’t you want a defendable, supportable record of activities, plans, decisions, potential, and envisioned contractual outcomes?
  - “we’ll let our engineers/program managers/secretaries do DM”
    - Well, we’ve all seen how well THAT’s working ...
Agenda

- What is Handbook 859?
  - A brief tour
- Questions to be answered
  - What is the landscape?
- Objectives of pre-acquisition activities
  - Focus
  - Questions
  - Sample value-added activities and contributions
- The Case for Early Intervention
- Aspects and elements of the DM Model

GEIA-859 was released on 4 August 2004
In ANSI progression, now, and should be ANSI-859, already
What is Handbook 859?

- Application guidance for ANSI-859
  - Industry Government Consensus Standard for Data Management
- Implements 9 essential and core principles for Data Management
  - Across sectors, across buyer and seller organizational boundaries
- Submitted to GEIA this week
  - 60-90 day approval cycle
    - Review, comment, resolution of comments, and voting by GEIA member companies
Look and Feel for Handbook 859
Content Overview

- Foreword
- Introduction
- How to Use the HB
- Intended Audience
- Resources
- Companion Documents
- Annexes
  - Intellectual Property, Acknowledgements, Continuous Improvement, Case Studies, Flow Templates, Glossary, References, Matrix from ANSI-859 to Handbook 859
- Full lifecycle DM
- Identification and Definition
- Acquisition and Preparation
- Data Asset Control
- Data Retention and Disposition
- Data Strategy
- Concept of Operations
- Data Preservation
Principle 1: GEIA-859

Key Practices
- Develop the DM Strategy and concept of operations
- Design the DM architecture
- Develop the DM process and infrastructure design
- Review the life cycle of the program to determine data needs
- Identify data requirements

Define the organizationally relevant scope of data management

Plan for, acquire, and provide data that is responsive to customer requirements

Develop DM processes to fit the context and business environment in which they will be performed

Identify products and views so that their requirements can be controlled

Control data, repositories, data products, data views, and metadata using an approved change control process

Establish and maintain a management process for intellectual property, proprietary, and competition-sensitive data

Establish a data management strategy and architecture

Establish a DM process and infrastructure design

Execute the DM solution and process

Maintain the DM process and infrastructure

Retain data commensurate with value

Continuously improve data management

Effectively integrate Data Management and Knowledge Management

Cross-references to Templates, Processes, & Case Studies
Questions Answered by Handbook 859 (Pre-acquisition Section)

- What is the **scope** of the DM process?
- What activities **comprise** the DM process?
- How is DM activity **related** to other functional activities and disciplines?
- What are the DM **objectives for each phase** of the program life cycle?
- What DM activities are **performed** in each phase? What decisions are made and what are the **criteria** for making them?
- What are the **benefits derived** from DM activities, and what are the risks if the activities are not performed?
- How can the DM process be **measured**, and how do the measurement metrics relate to DM objectives, and management objectives?
Scope of pre-RFP Activities

- Activities conducted very early in the DM lifecycle
  - Actually may precede the beginning of the program lifecycle
    - Example: requirements for a new capability
    - DM should capture and manage the documentation of initial requirements, significant changes in direction, and trade-offs that are made
- DM perspective ensures/provides data for later requirements traceability

DM Activities: 1) planning for DM across the lifecycle; and 2) Achieving and applying a Strategic DM perspective.
Sample Value-added DM Activities

- **Pre-RFP**
  - Data Strategy, CONOPS, data requirements

- **Concept Refinement**
  - Program decision criteria, provenance, outcomes
  - Technology trades analysis results
  - Down select/decision criteria
  - Requirements and objectives status/evolution
  - Emerging logistics/engineering issues
  - Test and evaluation issues
  - Modeling and simulation inputs, outputs, parameters, outcomes

Early ID, intervention, communication, and status tracking
Sample Value-added DM Activities, 2

- **Technology Development**
  - Analyses on technology evolution
  - EE, ME, human factors issues
  - Architecture design, trades

- **System Development and Demonstration**
  - SEMP, TEMP planning and element integration
  - Interface working group support
  - Flight test planning
    - Optics, telemetry, radar, quick-look data planning and support
    - Coordination with test ranges and facilities

- **Production and Deployment**
  - Spares and repairs issues
  - Next generation production decisions and challenges
  - Packages of data for review, decision, and communication

Note that the earlier the involvement, the more value is added
Sample Value-added DM Activities, 3

- Operations and Support
  - FMS data packages
  - Archival packages
  - Continued contract support (access ...)
  - Logistics spares and repairs
  - Support to the item manager
  - Release management activities

These contributions are the equivalent of taking aspirin a day to prevent heart attacks and strokes!

Early, sustained involvement assures that data is in place
Aggregate Benefits

- **Acquisition strategy is enhanced**
  - Data is identified for access only, for retrieval schedules and needs, and for acquisition priorities
  - Requirements are validated, tracked, and verified
    - Product data as well as supporting business data
    - Intellectual property considerations are identified early on
  - Down-select teams

- **Program management tasks are supported**
  - Decisions, actions tracked
  - Provenance established

- **Logistics support strategy is provisioned correctly**
  - Appropriate data is identified
    - COTS planning
    - Proper data is acquired, if access is not sufficient
    - **Costly contract modifications are avoided*** [~2M, generally]

- **Post-contract issues are addressed**
  - Data marking, data rights
  - Records management
  - Product release management
  - Contractual requirements are supported

* This doesn’t count such aspects as Intellectual property and data rights "changes"
New Perspectives

- **Data acquisition or information acquisition?**
  - They are different things
  - They are treated differently by data providers
  - They are valued, considered, and sold at radically different prices
- “Insight” management as opposed to “oversight” management
- Expectations are clearer, outcomes are structured and pre-ordained

Isn’t this what Logistics is all about?
Objectives of the Pre-Acquisition Phase, for DM

- **Focus:** types of data to be generated, accessed, acquired, exchanged *(inputs and outputs)*
- **Focus:** the life cycle of the data, the system being designed, and the uses to which data will be put
- **Focus:** sizing the solution
- **Focus:** identifying existing or emerging constraints, facilitators, roadblocks, inconsistencies, redundancies
The DM Process

Constraints
- Management support, facilities, resources, training
  - Defined processes/procedures
  - Effective working relationships
  - Acquisition and support strategies
  - List of required contractual data
- Regulations, standards, handbooks, and manuals
- History, lessons learned, and success case studies
  - Commercial practices
  - Tools and technology

Mechanisms & Facilitators
- Program initiation
- Enterprise Architecture
- User requirements
- Logistics & maintenance plans
- Data status and performance measurements

Inputs
- Timing
- Resources
- Laws and policies
- RFP/contract
- Infrastructure

Outputs
- Documented DM processes
- DM CONOPS & strategy
- RFP & contract data requirements defined, scheduled, and priced
- Standard descriptions of data products
- Current listing of required data
- Known data status
- Point of use data provisioning
- Archival or disposal plan
- DM performance measurements
- Lessons improved
- Program success, user support enhanced
Characteristics of the DM Process Model

- **Inputs**: Information needed to initiate and perform the process

- **Constraints**: Factors or information which inhibit, condition, or limit the process

- **Facilitators**: Information, tools, methods, and technologies which enable or enhance the DM process

- **Outputs**: Results derived from the process, and the information provided by the process, itself
Elements of the Top-Level DM Activities Model

- Laws and Regulations
- RFP and contract
- Acquisition and support strategies
- User requirements
- Provider recommendations
- DM planning, procedures, and training
- Data use metrics
- CONOPS/Data Strategy
- Data requirements to be placed on the contract
- Data provider proposals
- Data Management policy, procedures, and training
- Data provider submittals
- Product data
- Requests for data
- Access rules
- Negotiated and revised list of required data
- Data status
- Data provided to the point of use
- Availability for access
- Archival and disposal
Characteristics of the DM End Process

- Integrates DM process and supporting system
- Captures and manages configurable items which comprise the technical baseline
- Correlates and provides traceability among requirements, design, decisions, and rationale
- Supports configuration management procedures
- Serves as a ready reference for the development team
- Uses common and compatible information systems, tools, and formats
Broad Scope for DM

- Relates to the complete program life cycle
  - Systems engineering, program management, configuration management, business management, operational support, retention, archival
- Embraces use of common buyer and seller data formats, when and where feasible
- Reflects seamless integration of DM with all other functional activities and disciplines
- Extends to true “management of data” to create and provide a structure for insight management
Setting the Stage for Effective DM

- USG and Industry are moving to more concurrent acquisition process using Integrated Product Team management
  - This requires timely, accurate, cross-functional access to data
  - The IT infrastructure is essentially “ready”
    - DM processes and scope have lagged behind technology
- Traditional DM processes are still valid
  - New paradigmatic shift to “digital” format rather than paper-based products, and “access” rather than “acquire”
- Benefits and ROI are easily discerned
  - Better trade-off decisions
  - Problem identification comes much earlier in the life cycle and the process
  - Cycle times are reduced for decisions, information processing
  - Overhead costs eliminated or reduced for receiving, storing, and processing hard copy documents and product data
Outcomes Gained

- Better trade off decision support
- Enhanced communication between data providers and data acquirers
- Earlier identification of problem areas
- Decreased cycle times for decisions and information processing
- Elimination of overhead costs of receiving, storing, and processing hard copy documents
Sample DM Metrics

- On-time deliveries by year
- Deliverables delinquencies
  - Root process drivers by year, by program
- Classified cabinets eliminated by year, by program
  - Contract retirement, archival, retention schedules
- Unclassified documents scanned for use
  - Search time reduced or eliminated, offsite and onsite
- Electronic data interchange
  - Enabled by year, by program
- Library/website hits and patron visits
- Average DM funding by product line, by program, by year
- Aggregate DM core process consistency and improvements by year, by program
- Class II reasons for change (requirements, optics, SW, tech data, supportability, parts obsolescence) by program, by year
- On-time changes, YTD
- Class II change trend
- Data errors found by EDS
- Paper purchase requests versus electronic purchase requests
- Paper or electronic TDPs
Next: Acquisition and Preparation

- The right amount of data will be bought, delivered, or accessed
- The best data to support decision making and other customer functions will be available when needed
- Timing of delivery will be optimized
- Statements of work and objectives are more easily written, clearer, and resulting in fewer unpleasant surprises for the buyer and the supplier
- Data products will be discoverable, and when retrieved, will be associated with other relevant data products, product data, and views
- Data products and views will have metadata that help to ensure appropriate use and re-use
- It will be possible to recreate the set of data products and views in use at a given point in time
Summary

- Lots has happened in DM
  - DM’s not your father’s Oldsmobile, anymore
- The benefits gained from the investment in the solution don’t even compare
- ANSI-859 and Handbook 859 are ready to assist in better DM for you and your organization
- The DM panel has much more ahead
  - XML business objects modeling
  - Automation of DM processes inside PDM tools
  - DAU course modules for 13 career fields
    - Available for industry as well as for government
EIA-836 CM Data Exchange and Interoperability
CM Data to Support the Logistics Process

Alan Lager, MLR Associates
6585 Maggiore Drive
Boynton Beach, FL 33437
(561) 735-9511 / (561) 704-6646
alan_e_lager@msn.com
http://www.mlrassociates.com

NDIA TID Symposium
Miami, FL ~ March 4, 2005
CM Data Exchange and Interoperability

Agenda

- The Importance of CM Data to Logistics
- What EIA-836 is
- Applying EIA-836
- Revision/Version History
- Continuing EIA-836 Development
- EIA-836 Five Year Plan
The Importance of CM Data to Logistics

- A primary purpose of CM has always been to assist in logistic support
- But
  - Evolutionary Acquisition
  - Reduced Logistics Footprint
  - Rapid Deployment & Product Support
- Demand
  - Flawless configuration identification and control
  - Known multiple configurations of end items and corresponding support systems
- In other words -- **Timely, Accurate CM Data!!**
What EIA-836 Is

- The ability to make sense out of the stuff
  - Reference Model & Data Dictionary
    - Data Elements
    - Definitions
    - Relationships
- The ability to create Information Exchange Sets
  - Business Objects
- The ability to find unambiguous definition of all the information you need to know about CM (but were afraid to ask)
What EIA-836 Is

Tailor CM business objects
Formulate user-designed business objects

Reference Schema

Extracted

Relationships/context for objects, attributes, data elements and their associations

BO Header

Business Object

Data Exchange Messages

836 STD Text

Data Dictionary

Data Element Definitions

EIA-836

Text Extracted

Formulate user-designed business objects
Applying EIA-836

1. Exchanging Data

System A → Business Object Instance → System B

2. Mapping Databases

Canonical Standard

EIA-836

3. Interfacing Multiple Systems

Input/Output Screens/Messages

Style-sheets

Interface based on EIA-836
Revision/Version History

- Project initiated January 2000
- Initial release published 15 June 2002
  - Reference Schema Version 1.0
- Incremental Rev with “standalone” Business Objects - January 2004
  - Version 1.1 (Redlined) & Version 1.2 (Redlines Accepted)
- EIA-836 Revision A (Schema Version 2.0) in process
  - New look
  - Newer XML technologies
  - Consistent design methodology
  - Focused on objects and relationships
  - Less redundancy, easier creation and maintenance
FIVE YEAR PLAN

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836A Version 2.0

To DoD XML Registry

Handbook (if necessary)

Application/Training Integration w/Tools

Version 3.0 Expand/Merge DM

Institutionalize as Part of CM/DM Process
Challenges We Face

Demands will increase from FY04 rates ... which were an all time high
Aviation Will Always Be A Key Component

**Apache**

- FY00: 28,096
- FY01: 30,262
- FY02: 31,599
- FY03: 38,926
- FY04: 38,962
- FY05*: 39,936

**Black Hawk**

- FY00: 54,292
- FY01: 59,354
- FY02: 70,640
- FY03: 79,605
- FY04: 88,574
- FY05*: 89,202

**Chinook**

- FY00: 16,117
- FY01: 18,314
- FY02: 22,149
- FY03: 27,102
- FY04: 35,398
- FY05*: 36,282

**Kiowa Warrior**

- FY00: 4,017
- FY01: 6,154
- FY02: 6,780
- FY03: 11,104
- FY04: 14,497
- FY05*: 14,859

*Projected

**Demands Continue to Increase**

**FY05 Projects 2% Higher Than FY04 and Growth Since Sep 11 Over 65%**
No Matter How You Measure, Aviation Is The Backbone Of Support

Demands

<table>
<thead>
<tr>
<th></th>
<th>FY00</th>
<th>FY01</th>
<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M</td>
<td>1,928</td>
<td>1,858</td>
<td>2,263</td>
<td>4,316</td>
<td>4,379</td>
<td>4,414</td>
</tr>
</tbody>
</table>

Sales

<table>
<thead>
<tr>
<th></th>
<th>FY00</th>
<th>FY01</th>
<th>FY02</th>
<th>FY03</th>
<th>FY04</th>
<th>FY05*</th>
</tr>
</thead>
<tbody>
<tr>
<td>$M</td>
<td>1,671</td>
<td>1,654</td>
<td>2,049</td>
<td>3,583</td>
<td>3,648</td>
<td>4,169</td>
</tr>
</tbody>
</table>

* Projected
Army Fleet in OIF

511,276 Total Hours:
01 Feb 03 – 28 Feb 05

**AH-64 (143)**
96,750 Hours
MC: 88%
OPTEMPO: 28

**CH-47 (44)**
32,140 Hours
MC: 72.8%
OPTEMPO: 30.6

**OH-58 (80)**
134,939 Hours
MC: 80.4%
OPTEMPO: 73.3

**UH-60 (254)**
179,726 Hours
MC: 86.6%
OPTEMPO: 33.8

**Fixed Wing (30)**
31,982 Hours
MC: 86.6%
OPTEMPO: 43.9

- (12) Shadow 21,205 hrs
- (1) Hunter 8182 hrs
- (1) I-GNAT 3997 hrs
- (122) Raven 2355 hrs

军用舰队在OIF

总小时数：511,276

- **AH-64 (143)**
  - 小时数：96,750
  - MC：88%
  - OPTEMPO：28

- **CH-47 (44)**
  - 小时数：32,140
  - MC：72.8%
  - OPTEMPO：30.6

- **OH-58 (80)**
  - 小时数：134,939
  - MC：80.4%
  - OPTEMPO：73.3

- **UH-60 (254)**
  - 小时数：179,726
  - MC：86.6%
  - OPTEMPO：33.8

- **Fixed Wing (30)**
  - 小时数：31,982
  - MC：86.6%
  - OPTEMPO：43.9

- 12架影子 21,205小时
- 1架猎人 8182小时
- 1架I-GNAT 3997小时
- 122架拉文 2355小时

OPTEMPO显著高于和平时期
Army Fleet in OEF

73,087.7 Total Hours:
01 Feb 03 – 28 Feb 05

AH-64A (19)
28,530 Hours
MC: 82%
OPTEMPO: 56

CH-47 (23)
20,759 Hours
MC: 82%
OPTEMPO: 43.6

UAV (6 Raven)
531.7 Hours

(37) UH-60
14,031 Hours
MC: 76.4%
OPTEMPO: 38.1

(13) Fixed Wing
5823 Hours
MC: 86.8%
OPTEMPO: 48.9

(16) OH-58
3413 Hours
MC: 83%
OPTEMPO: 48.3

OPTEMPO Significantly Higher than Peacetime
Challenges We Face

Demands will increase from FY04 rates ... which were an all time high

Support for OEF/ OIF units has been exceptional, but improvements must extend to all aviation customers
AVAILABILITY IMPACTED BY FUNDING SHORTFALLS

$'s Invested

- FY97: $385.1M, Short $187M
- FY98: $577.3M, Short $32.5M
- FY99/00: $639.5M/$880.9M, Short $3.9M
- FY01: $1033.2M, Short $162M
- FY02: $1219.8M, Short $309.6M
- FY03: $2905.1M, Short $402.6M
- FY04: $2811.2M, Short $174.0M

FY97
FY98
FY99
FY00
FY01
FY02
FY03
FY04

OH Servicable
Stock Due-Out
Demands

*OH Servicable
Stock Due-Out
Demands
Inventories – Now Trending In The **Right** Direction

- **Downsized & divested inventory**
- **Emptied bins to support operations**
- **Funding provided to buy parts**
- **Flying hours drove an increased demand**
- **Stocks now being reconstituted**

**Challenges We've Addressed**
- A cold industrial base when hostilities began
- Demand increasing exponentially

This tracks the percent of the total requirement that is on the shelf and available for issue.
Backorder Trends
Recent History

Apache

<table>
<thead>
<tr>
<th></th>
<th>Sep-03</th>
<th>Jan-04</th>
<th>Mar-04</th>
<th>Jun-04</th>
<th>Sep-04</th>
<th>Dec-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset</td>
<td>77</td>
<td>210</td>
<td>207</td>
<td>530</td>
<td>654</td>
<td></td>
</tr>
<tr>
<td>IPG 2, IPG 3</td>
<td>2,324</td>
<td>2,582</td>
<td>2,097</td>
<td>1,929</td>
<td>2,381</td>
<td>2,581</td>
</tr>
<tr>
<td>IPG1</td>
<td>1,638</td>
<td>1,582</td>
<td>1,258</td>
<td>975</td>
<td>1,583</td>
<td>1,897</td>
</tr>
</tbody>
</table>

Black Hawk

<table>
<thead>
<tr>
<th></th>
<th>Sep-03</th>
<th>Jan-04</th>
<th>Mar-04</th>
<th>Jun-04</th>
<th>Sep-04</th>
<th>Dec-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset</td>
<td>233</td>
<td>585</td>
<td>886</td>
<td>2,039</td>
<td>1,938</td>
<td></td>
</tr>
<tr>
<td>IPG 2, IPG 3</td>
<td>10,747</td>
<td>10,150</td>
<td>9,056</td>
<td>8,159</td>
<td>8,162</td>
<td>7,916</td>
</tr>
<tr>
<td>IPG1</td>
<td>5,811</td>
<td>6,077</td>
<td>4,744</td>
<td>3,722</td>
<td>4,154</td>
<td>2,505</td>
</tr>
</tbody>
</table>

Chinook

<table>
<thead>
<tr>
<th></th>
<th>Sep-03</th>
<th>Jan-04</th>
<th>Mar-04</th>
<th>Jun-04</th>
<th>Sep-04</th>
<th>Dec-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset</td>
<td>117</td>
<td>262</td>
<td>500</td>
<td>1,755</td>
<td>2,008</td>
<td></td>
</tr>
<tr>
<td>IPG 2, IPG 3</td>
<td>2,726</td>
<td>2,496</td>
<td>2,025</td>
<td>2,263</td>
<td>3,257</td>
<td>3,601</td>
</tr>
<tr>
<td>IPG1</td>
<td>1,891</td>
<td>2,015</td>
<td>1,721</td>
<td>1,479</td>
<td>2,549</td>
<td>1,982</td>
</tr>
</tbody>
</table>

Kiowa Warrior

<table>
<thead>
<tr>
<th></th>
<th>Sep-03</th>
<th>Jan-04</th>
<th>Mar-04</th>
<th>Jun-04</th>
<th>Sep-04</th>
<th>Dec-04</th>
</tr>
</thead>
<tbody>
<tr>
<td>Reset</td>
<td>83</td>
<td>61</td>
<td>100</td>
<td>739</td>
<td>726</td>
<td></td>
</tr>
<tr>
<td>IPG 2, IPG 3</td>
<td>496</td>
<td>725</td>
<td>408</td>
<td>704</td>
<td>875</td>
<td>846</td>
</tr>
<tr>
<td>IPG1</td>
<td>376</td>
<td>563</td>
<td>370</td>
<td>503</td>
<td>821</td>
<td>521</td>
</tr>
</tbody>
</table>

IPG1 reduced 33% over past 12 mos

Reset now constitutes single largest customer
Dear Sir,

I am CW3 Robert Carpenter. I am writing to express my gratitude for the quality rotor blades that Bell has produced for my helicopter, the OH-58D Kiowa Warrior.

On April 7th, while flying a combat mission near the city of Baqubah, Iraq my KW was struck on one main rotor blade by an RPG (rocket propelled grenade). The RPG exploded and destroyed a 4 foot section, leaving about two feet of rotor blade on the end. The spar was also damaged and I still don't know how it held together.

Thank you.

v/r,
Robert Carpenter
CW3, U.S. Army

"... I am writing to express my gratitude for the quality rotor blades that Bell has produced..."
What We Are Facing

Demands will increase from FY04 rates ... which were an all time high

Support for OEF/OIF units has been exceptional, but improvements must extend to all aviation customers

The investments are yielding significant deliveries but problem items still must be targeted
**Individual Item Assessment**

**APACHE**
Total Items - 3,311

- Fully Supportable Today: 2,862
- Partially Supportable Today/Fully Within 12 Months: 346
- Partially Supportable Today/Fully After 12 Months: 103

**KIOWA**
Total Items - 1,525

- Fully Supportable Today: 1,311
- Partially Supportable Today/Fully Within 12 Months: 185
- Partially Supportable Today/Fully After 12 Months: 29

**CHINOOK**
Total Items - 1,901

- Fully Supportable Today: 1,527
- Partially Supportable Today/Fully Within 12 Months: 244
- Partially Supportable Today/Fully After 12 Months: 130

**BLACKHAWK**
Total Items - 2,527

- Fully Supportable Today: 2,264
- Partially Supportable Today/Fully Within 12 Months: 202
- Partially Supportable Today/Fully After 12 Months: 61

**Over 85% of all items are fully supportable.**
### Tactical Focus Has Been On Warfighter

<table>
<thead>
<tr>
<th>OIF I/OEF IV</th>
<th>OIF II/OEF V</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>(30 Sep 03)</strong></td>
<td><strong>(14 Feb 05)</strong></td>
</tr>
<tr>
<td><strong>643 Aircraft</strong></td>
<td><strong>537 Aircraft</strong></td>
</tr>
<tr>
<td>268 Non-Mission Capable (NMC)</td>
<td>78 NMC</td>
</tr>
<tr>
<td>75 NMC Due to Supply</td>
<td>7 NMC Due to Supply</td>
</tr>
</tbody>
</table>

- Emphasis now on “Preset” of aircraft prior to deployment
- OIF/ OEF units first to receive critical parts delivered from industry
- Focusing on NMCS is the quickest means for AMCOM to influence theatre readiness
**BACKORDER REDUCTION PLAN**

17% Reduction in Requisitions

34% Reduction in Quantities

WE’RE AHEAD OF OUR PLAN — BACKORDERS AT $1,032M a/o 17 FEB

**Graph:**
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $388M, $303M
- Sep-05 GOAL: $280M
- Sep-04: $447M, $329M
- Sep-05 GOAL: $322M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M

**Key Points:**
- 17% Reduction in Requisitions
- 34% Reduction in Quantities
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $388M, $303M
- Sep-05 GOAL: $280M
- Sep-04: $447M, $329M
- Sep-05 GOAL: $322M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
- Sep-04: $239M, $274M
- Sep-05 GOAL: $173M
What Customers Have Seen Over the Past 12 Months

Backorders Decreased
- 701C Engine: 35%
- Blackhawk APUs: 66%
- Chinook APUs: 22%
- Blackhawk A Transmissions: 35%
- Blackhawk L Transmissions: 35%

Assets Available for Issue Increased
- 60+
- 86%
- 200%
- 200%
- $3.8M
- $5.6M

On hand inventory for Top 18 readiness drivers up $58M

Leading edge maintenance on Blackhawk Main Rotor Blades

“Preserving Valuable Assets”

$350M+ in engines, transmissions, blades, and APUs received over past 180 days - additional $800M being delivered over next 36 mos
Industry Has Responded

Top 25 Apache & Chinook Items

- Schedule improvements ranged from 10-80%
- Rotor Shaft
  - Yield increased 64%
  - Production lead time decreased 83%
- Blade
  - Production cycle decreased from 23 to 10 months

Sikorsky Blackhawk

- Production improved across the board
- Main Blade
  - Production has increased from 20 to 75/month
- Tail Blades
  - Production has increased from 20 to 60
- Structural Supports (Top Reset Item)
  - Ramped from a cold case of 20/mo to 200/month by JAN 05

Kiowa Warrior

- Repair turn-around improved 68%
- Mast Mounted Sight
  - Production time reduced 44%

Organic Depot Capacity

- Expanding through partnership contracts with industry
The Focus Is On Production

$M Deliveries

<table>
<thead>
<tr>
<th>Company</th>
<th>$M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sikorsky</td>
<td>280.6</td>
</tr>
<tr>
<td>Lockheed</td>
<td>44.4</td>
</tr>
<tr>
<td>GE</td>
<td>694.8</td>
</tr>
<tr>
<td>Boeing, Phil</td>
<td>112.4</td>
</tr>
<tr>
<td>Boeing, Mesa</td>
<td>83.8</td>
</tr>
<tr>
<td>Honeywell</td>
<td>182.2</td>
</tr>
<tr>
<td>Parker Hannifin</td>
<td>75.3</td>
</tr>
<tr>
<td>DRS Tech</td>
<td>64.1</td>
</tr>
<tr>
<td>Bell</td>
<td>30.0</td>
</tr>
<tr>
<td>Raytheon</td>
<td>47.2</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>1,614.8</strong></td>
</tr>
</tbody>
</table>

Investment

<table>
<thead>
<tr>
<th>Company</th>
<th>$M</th>
</tr>
</thead>
<tbody>
<tr>
<td>Sikorsky</td>
<td>1,022.6</td>
</tr>
<tr>
<td>Lockheed</td>
<td>476.4</td>
</tr>
<tr>
<td>GE</td>
<td>839.8</td>
</tr>
<tr>
<td>Boeing, Phil</td>
<td>458.6</td>
</tr>
<tr>
<td>Boeing, Mesa</td>
<td>264.2</td>
</tr>
<tr>
<td>Honeywell</td>
<td>386.1</td>
</tr>
<tr>
<td>Parker Hannifin</td>
<td>218.8</td>
</tr>
<tr>
<td>DRS Tech</td>
<td>170.4</td>
</tr>
<tr>
<td>Bell</td>
<td>178.6</td>
</tr>
<tr>
<td>Raytheon</td>
<td>74.9</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>4,090.4</strong></td>
</tr>
</tbody>
</table>

$63M +

Long Lead Items

Moving deliveries left with incentives & intensive management

Total All Suppliers $5,869.0
Demands will increase from FY04 rates ... which were an all time high

Support for OEF/OIF units has been exceptional, but improvements must extend to all aviation customers

The investments are yielding significant deliveries but problem items still must be targeted

Limited supplier base and age of technologies challenges more aggressive accelerations
# Production Issues We’re Addressing

<table>
<thead>
<tr>
<th><strong>Castings and forgings have leadtimes ranging from 12-36 mos</strong></th>
<th><strong>2nd &amp; 3rd tier vendor base diminishing while existing sources are saturated</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Alcoa only source of aluminum forgings for 58D Rotor Heads - minimum 40 week leadtime</td>
<td>- Timken only qualified sources for certain bearings</td>
</tr>
<tr>
<td>- New sources want assurance of future business to justify investing facilitization capital</td>
<td>- Primes, OEMs, and depots chasing the same single sources for piece parts</td>
</tr>
<tr>
<td>- We’ve used RIA and are qualifying vendors via our Prototype Integration Facility (PIF)</td>
<td>- Qualification process for new sources requiring First Article Test (FAT) and/or Product Verification Audit (PVA) being streamlined</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th><strong>Certain Critical Safety Items (CSI) require raw materials with limited availability</strong></th>
<th><strong>Depot production offers most expedient deliveries</strong></th>
</tr>
</thead>
<tbody>
<tr>
<td>- Titanium sheaths for blades and ESR steels for gears</td>
<td>- unserviceables delayed in theatre – combination of TASM and Desert Express have improved performance</td>
</tr>
<tr>
<td>- Long-lead material now being funded where appropriate</td>
<td>- CCAD Partnerships have enabled component production to grow by more than $100M from FY04 levels</td>
</tr>
</tbody>
</table>
The VOLS SUCK!
ROLL TIDE
ROLL!
IEEE Std 828-1990

IEEE Standard for Software Configuration Management Plans
IEEE Std 828-1990

Purpose:

Establishes the *minimum required contents* of a Software Configuration Plan and defines the specific activities to be addressed and their requirements for any portion of a software product’s life cycle.
IEEE Std 828-1990

Use of an IEEE Standard is wholly voluntary.

The existence of an IEEE Standard does not imply that there are no other ways to produce, test, measure, purchase, market, or provide other goods and services related to the scope of the IEEE Standard.
IEEE Std 828-1990

This Standard applies to the entire life cycle of critical software.

The Software Configuration Management Plan (the Plan) documents

• what SCM activities are to be done,
• how they are to be done,
• who is responsible for doing specific activities,
• when they are to happen, and
• what resources are required.
IEEE 828-1990

The Plan shall be partitioned into the following six classes:

1. Introduction: Purpose, Scope, Key Terms, and References.

2. SCM Management: *(WHO?)* Identifies the responsibilities and authorities for accomplishing the planned activities.

3. SCM Activities: *(WHAT?)* Identifies all activities to be performed.
The Plan shall be partitioned into the following six classes:

4. SCM Schedules: (WHEN?) Identifies the required SCM activities with the other activities in the project.

5. SCM Resources: (HOW?) Identifies tools and physical and human resources required for execution of the plan.

6. SCM Plan Maintenance: Identifies how the Plan will be kept current while in effect.
Introduction:

1. Overview of the software development project.
2. Identification of the Software CI (s) to which SCM will be applied.
3. Identification of other software to be included (e.g., support or test software).
4. Relationship of SCM to the hardware or systems configuration management activities.
5. The degree of formality, dept of control, and portion of the software life cycle for applying SCM.
6. Limitations, such as time constraints.
7. Assumptions that might have an impact on the cost, schedule, or ability to perform defined SCM activities.

IEEE 828-1990
IEEE 828-1990

SCM Management:

1. Organization

2. SCM Responsibilities

3. Applicable Policies, Directives, and Procedures
IEEE 828-1990

SCM Activities:

1. Configuration Identification
2. Configuration Control
3. Status Accounting
4. Configuration Audits and Reviews
1. Configuration Identification
   - Identifying Configuration Items
   - Naming Configuration Items
   - Acquiring Configuration Items

2. Configuration Control
   - Requesting Changes
   - Evaluating Changes
   - Approving or Disapproving Changes
   - Implementing Changes
IEEE 828-1990

3. Configuration Status Accounting

4. Configuration Audits and Reviews

5. \textit{Interface Control}

6. \textit{Subcontractor/Vendor Control}
IEEE 828-1990

SCM Schedules:

1. Establishes the sequence and coordination for the identified SCM activities and events.

2. Dependencies among all SCM activities (Milestones and events).
   - Configuration Baselines
   - Implementation of Change Control
   - Start and completion dates for a Configuration Audit

3. Duration of the Plan.
IEEE 828-1990

SCM Resources:

1. Software Tools
2. Techniques
3. Equipment
4. Personnel
5. Training necessary for the implementation of the specified SCM activities
IEEE 828-1990

SCM Plan Maintenance:

1. Who is responsible for monitoring the Plan.

2. How frequently updates are to be performed.

3. How changes to the Plan are to be evaluated and approved.

4. How changes to the Plan are to be made and communicated.
Summary:

The IEEE Standard permits significant flexibility in preparing an SCM Plan.

A successful Plan reflects its project environment.

It should be written in terms familiar to its users and should be consistent with the development and procurement processes of the project.
IEEE 828-1990

Questions?
Military Engineering Data Asset Locator System (MEDALS) Data Quality

Warren M Scott
Federal Center 269.961.5509
74 Washington Ave N STE 7 DSN 661.5509
Battle Creek MI FAX 269.961.4715
49017-3084
E-Mail warren.scott@dlmil

Defense Logistics Information Service
Customer Support Toll Free: 1-877-352-2255

8/31/2016
Mandated procedures for developing, to the maximum extent practical, a centralized system to identify the repository within the Department of Defense (DoD) responsible for technical data relating to an item and the extent of data on file in the repository with respect to that item.
MEDALS

- The DoDs Centralized Indexing Authority
- Getting the Customer to the Desired Repository Faster
- The MEDALS program supports over 50,000 queries per month
- Saves the Repositories Time, Money, and Resources
MEDALS

Indexing A Family of Systems

JEDMICS
CENTRA
ACMS
DBASE
ATIS

8/31/2016
MEDALS CURRENTLY INDEXES OVER 42 MILLION ASSETS
Participating Repositories

DLA
- DSC-Columbus
- DSC-Richmond
- DSC-Philadelphia
- DLIS-NATO
- DAPS, Newport, RI

Air Force
- OO-ALC, Hill AFB, UT
- OC-ALC, Tinker AFB, OK
- WR-ALC, Warner Robins AFB, GA

Army
- AMCOM, Redstone Ars., Huntsville, AL
- ARDEC, Picatinny Ars., Dover, NJ
- TACOM, Warren, MI
- Rock Island Ars., Rock Island, IL
- CECOM, Ft. Monmouth, NJ
- Edgewood Chemical and Biological Command

Marine Corps
- MCLB, Albany, GA

Boeing  Sikorsky  Honeywell
Lockheed  General Dynamics  Sperry
Univac  Raytheon  Litton
Participating Repositories

**Navy**

- NSY, Portsmouth, NH
- NAVICP-M, Mechanicsburg, PA
- NSWC, Crane, IN
- NSWC, Indian Head, MD
- NSWC, Dahlgren, VA
- NSY Norfolk, Portsmouth, VA
- NSY Puget Sound, Bremerton, WA
- NUWC, Keyport, WA
- NSY, Pearl Harbor, HI
- NCSS, Panama City, FL
- NATEC, San Diego, CA
- NSY Puget Sound, Det Boston, MA
- NUWC Newport, RI
- SUPSHIP Bath Iron Work, Bath, ME
- SUPSHIP Newport News, VA
- NGSS, Pascagoula, MS
- NSWC, Port Hueneme, CA
- NSWC Indian Head, Det Earl, NJ
- SPAWAR Charleston (Coming soon)

**Other Companies**

- Northrop Grumman
- Litton
- Boeing
- Lockheed
- General Dynamics
- Eaton
- General Electric
- Lucent
- Litton
- Northrop Grumman
APPLYING FOR ACCESS IS QUICK AND EASY
CONTRACTOR ACCESS

- Must have a DoD Sponsor
- Qualified U.S. Contractor is certified via the Military Critical Technical Data Agreement, DD Form 2345
- The contractor (CAGE) organization has been verified to be in good standing with the DoD
- A valid Registration for Scientific and Technical Information Services, DD Form 1540, is on file with the Defense Technical Information Center (DTIC)
- National Agency Check (NAC) or equivalent type of Investigation
CONTRACTOR ACCESS

- The MEDALS program manager reserves the right to withdraw services from any contractor individual or parent company for any misuse of the intended use of the MEDALS program.
- Access to the MEDALS program does not imply or grant access to the technical data indexed.
- MEDALS access when engaged in an active contract, project, or program where within its scope it states that a tool such as MEDALS is required or when a DoD Sponsor determines a need for services is required.
- MEDALS access is not available to foreign nationals.
CONTRACTORS ACCESSING MEDALS

ALPHIA DATA CORP
AMSEC LLC
APPLIED ORDINANCE TECHNOLOGIES
ARINC ENGINEERING SERVICE
BMT DESIGNERS AND PLANNERS
BOEING
CACI
CACI – ASG
CHEROKEE INFORMATION SERVICES
EG&G
ENVISIONEERING
GENERAL DYNAMICS
GRYPHON
IBM
INTERGRAPH
LOCKHEED MARTIN INFORMATION TECHNOLOGIES
MADISON RESEARCH CORP
ML TECHNOLOGIES
NGIT
PECKHAM
QUALITY PERFORMANCE INC
QUANTI TECH INC
REGENT SYSTEMS INC
SAIC
SCIENCE APPLICATION INTERNATIONAL CORP
SEMCOR INC
SOBRAN INC
SUPPORT SYSTEMS ASSOC. INC
TEAM KEYPORT SERVICES
UNIDYNE
WFI GOVERNMENT SERVICES INC
Getting The Navy Researcher To The Right Repository

Managed by the Defense Logistics Information Service, the Military Engineering Data Asset Locator System (MEDALS) is an automated information system that serves as the central index of engineering data for the Department of Defense (DOD). DOD technical data repositories, which store, maintain, and distribute the engineering data, support the technical drawing indexing data and associated information. MEDALS is a system that indicates where technical documents reside, links you to the WEB repositories, and allows you to order it fast...by phone, mail, FAX, E-mail, or electronic transmission. MEDALS is a multi-media (e.g. CD-ROM, floppy disk, or diskette). Access to the MEDALS indexing data does not imply or grant access to the technical data indexed.

Customer Service: 1-877-352-2255 or DSN 661-7766 Email: DLIS-Support@dlis.dla.mil
Privacy/Security | Accessibility | Contact Webmaster

This Site Reviewed Quarterly
Last Updated: Tuesday, February 24, 2004
NAVSEA ENGINEERING DRAWING REPOSITORIES AND CORRESPONDING CATEGORIES OF DRAWING STORED

Commanding Officer
Naval Surface Warfare Center Crane (Code 802)
Crane, IN 47522-5001
Telephone: Commercial: (812) 854-4870 DSN: 482-4870
Combat System, Weapon System and Ordnance System drawings

Commander
Portsmouth Naval Shipyard (NAVSHIPSYD PTSMH) (Code 202.2)
Portsmouth, NH 03804-5000
Telephone: Commercial: (207) 438-1000 Ext. 2445 DSN: 684-2445/1718
NAVSEA Standard and Type drawings (Hull, Mechanical and Electrical), SSN 637 Class submarine drawings, DSV/DSRV drawings, AGSS 555 drawings
Serves as a JEDMICS site

Commander
Puget Sound Naval Shipyard (NAVSHIPSYD PUGET) (Code 203.3)
Bremerton, WA 98314-5000
Telephone: Commercial: (206) 476-2128 DSN: 439-2128
AE-26, AO-177, AOE-1, ARS-50, CV-63, CVN-65, MCM-1, MCS drawings
Serves as a JEDMICS site

Director
NAVSHIPSYD PUGET Detachment Boston (Code 284.7)
495 Summer Street
Boston, MA 02210-2144
Telephone Commercial: (617) 555-0150/2150

LISTING OF PLANNING YARD REPOSITORIES BY CLASS SHIP AND WEAPONS SYSTEM
Comprehensive Listing of repositories
<table>
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<tr>
<th>Address</th>
<th>Phone/E-Mail</th>
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<tr>
<td>Engineering Data Support Center</td>
<td>DSN 336-4422</td>
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<tr>
<td>OC-ALC/LGLDOS</td>
<td>COM (405) 736-4422</td>
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<tr>
<td>3001 Staff Dr., Ste 1AC83A</td>
<td><a href="mailto:oc-alc.lgldo.cs@tinker.af.mil">oc-alc.lgldo.cs@tinker.af.mil</a></td>
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<td>Engineering Data Support Center</td>
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<td>OO-ALC/LGVPE</td>
<td>COM (801) 775-6078</td>
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<tr>
<td>6032 Fir Ave., Bldg 1237</td>
<td><a href="mailto:hill.jedmics@hill.af.mil">hill.jedmics@hill.af.mil</a></td>
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<td>DSN 472-3008/3009</td>
</tr>
<tr>
<td>WR-ALC/LGEBD</td>
<td>COM (478) 222-3008/3009</td>
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<tr>
<td>480 Second Street, Suite 200</td>
<td><a href="mailto:jedmics@robins.af.mil">jedmics@robins.af.mil</a></td>
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<tr>
<td>Robins AFB GA 31098-1640</td>
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Inquiries Based On Technical Drawing Information

- **Drawing Asset Identifier**
  - Drawing Number
  - CAGE Code
  - Document Type
  - Revision Level

- **Drawing Number/CAGE**

- **Drawing Number**

- **Part Number/CAGE**

- **Part Number**

- **NSN/NIIN**

- **Document Title**
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- **NAVY HOLDING REVISION “J”**
- **AIR FORCE HOLDING REVISION “N”**
- **ARMY HOLDING REVISION “P”**

**KNOWING WHERE ALL REVISIONS ARE LOCATED**
## MEDALS Repository Detail

### Repository Detail

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**Hyperlink to Repository:**

https://edm.monmouth.army.mil/cgi-bin/showDoc.exe?bk1_loginFVPV.html

**File Type Information**

**List Associated NSNs**

**Associated Weapon System Codes**

**List Associated Part Numbers**

**Repository Information**

**Mailing Address:**

US ARMY COMMUNICATIONS AND ELECTRONIC COMMAND
AMSEL-IM-T-CS-A
BLDG 1152 VAIL HALL
FT. MONMOUTH
NJ 07703-5000

**URL TO REPOSITORY SIGN ON SCREENS**

**ONE CLICK AWAY FROM WEB REPOSITORY ACCESS**
AND YOU’RE THERE

Trouble logging in? Forgot password? E-Mail Jose.Troche@mail.monzmounth.army.mil
Do not include password information in the email!
We will never ask you what your password is.

Send WEB SITE Comments/Questions to Brian Kelly
(Brian.Kelly@mail.monzmounth.army.mil)
DCN 023-1456
MEDALS TO REPOSITORY WEB INTERFACES

CURRENTLY ACTIVE INTERFACES

- DSC-Columbus
- DSC-Philadelphia
- DSC-Richmond
- AMCOM, Redstone Ars, Huntsville, AL
- TACOM, Warren, MI
- Rock Island Ars., Rock Island, IL
- CECOM, Ft. Monmouth, NJ
- OO-ALC, Hill AFB, UT
- OC-ALC, Tinker AFB, OK
- WR-ALC, Warner Robins AFB, GA

FUTURE INTERFACES

- NAVICP-M, Mechanicsburg, PA
- NUWC, Keyport, WA
- NATEC, San Diego, CA
- NSWC, Port Hueneme, CA
- NGSS, Pascagoula, MS
- SUPSHIP, Bath, ME
- ARDEC, Picatinny Ars., Dover, NJ
- MCLB, Albany, GA
- NSWC, Crane, IN
WHAT MEDALS IS “NOT”

- A repository of digital images
  - Digital images/technical data are the sole responsibility of the repository

- A pass through or portal to bypass access and security protocols for digital images/technical data maintained by a repository
  - The repository is responsible for the access and permissions to their digital images/technical data
  - MEDALS will not violate Proprietary Data issues or intellectual Property issues

- The owner of the data indexed
  - MEDALS is a steward of the repositories indexed data
WHAT THE MEDALS PROGRAM “IS”

- A tool for the repositories in assisting customers in locating digital images/technical data
  - Using MEDLAS first alleviates the necessity of the repository to field queries regarding the availability of digital images/technical data
  - A way to reduce infrastructure within a repository: saving time, money, & resources

- MEDALS is always available
  - DLIS staffs a 24/7 customer support center
  - MEDALS PMO available during business hours for customer support
Where does MEDALS fit in with DM and EIA-859

Contemporary Data Management Model

MEDALS is available as a tool for customers to verify location prior to repository access. First step in the process of determining if a repository is maintaining specific data.
4.0 Principle: Identify Data Products and Views so That Their Requirements and Attributes can be Controlled

“Data is of value to the enterprise when it can be located or accessed by users. Metadata, or data about data, is essential for data managers and others to identify, catalog, store, search for, locate, and retrieve data”

MEDALS is the fundamental nature of this concept
EIA-859 Table 4-1 Metadata Examples & MEDALS Tables

Attribute

- Author
- Classification
- Contract Identifier
- Date Modified
- Date Originated
- Document Number
- Document Owner
- Document Size
- Document Type
- Environmental Requirements
- File Format
- File Size
- File Type
- Enterprise Identifier
- Related Document ID
- Related Product ID
- Revision Identifier
- Rights
- Storage Medium

MEDALS Attributes

- Repository Location
- Repository Information
- Security Code
- Distribution statement
- File Index Date
- Document Number
- Document Size
- Number of Sheets
- Document Type
- Nuclear Hardness Critical Items/Processes (HCI) or (HCP)
- Yes/No field indicating distribution authorization to Foreign Nationals
- Level One SUBSAFE
- File Type
- CAGE Code
- Associated Weapons Systems Code
- Associated Part Numbers
- Associated NSN’s
- Revision Level
- Data Rights Code
CONCLUSION

The MEDALS program is a logical and complementary fit with EIA-859

- Establishing and maintaining an indexing account is easy
  - MEDALS infrastructure is in place and working, cost wise it is advantageous for the repository

- MEDALS is a way to reduce infrastructure within a repository
  - The burden of fielding inquiries for the availability of digital images/technical data can be avoided through the use of MEDALS

- MEDALS is flexible
  - MEDALS tables or Attributes can be established to fit with EIA-859 requirements
QUESTIONS