



Department of Defense MANUAL

NUMBER 4140.01, Volume 7
February 10, 2014

USD(AT&L)

SUBJECT: DoD Supply Chain Materiel Management Procedures: Supporting Technologies

References: See Enclosure 1

1. PURPOSE

a. Manual. This manual is composed of several volumes, each containing its own purpose, and reissues DoD 4140.1-R (Reference (a)). The purpose of the overall manual, in accordance with the authority in DoD Directive 5134.12 (Reference (b)), is to:

(1) Implement policy, assign responsibilities, and provide procedures for DoD materiel managers and others who work within or with the DoD supply system consistent with DoD Instruction 4140.01 (Reference (c)).

(2) Establish standard terminology for use in DoD supply chain materiel management.

b. Volume. This volume implements the policies established in Reference (c) and prescribes procedures for the technologies supporting DoD supply chain materiel management.

2. APPLICABILITY. This volume applies to OSD, the Military Departments, the Office of the Chairman of the Joint Chiefs of Staff and the Joint Staff, the Combatant Commands, the Office of the Inspector General of the Department of Defense, the Defense Agencies, the DoD Field Activities, and all other organizational entities within the DoD (referred to collectively in this volume as the "DoD Components").

3. RESPONSIBILITIES

a. Assistant Secretary of Defense for Logistics and Materiel Readiness (ASD(L&MR)). In accordance with Reference (b) and under the authority, direction, and control of the Under Secretary of Defense for Acquisition, Technology, and Logistics (USD(AT&L)), the ASD(L&MR) supports the development of emerging logistics technologies that strengthen the capabilities of the DoD supply chain.

b. DoD Component Heads. The DoD Component heads:

(1) Implement the procedures prescribed in this volume and ensure that supplemental guidance and procedures are in accordance with Reference (c) and this volume.

(2) Implement and maintain modern materiel management systems.

(3) Develop and execute a supply chain data management strategy that promotes the use of shared enterprise services including common shared data, common interfaces with data systems, and shared data services, wherever possible.

(4) Use automatic identification technology (AIT) in all logistics processes, wherever possible.

(5) Evaluate the size and resource requirements necessary to develop and improve the logistics enterprise to meet DoD supply chain performance goals.

(6) Use product support data to ensure life-cycle sustainment and continuous improvement of product affordability, reliability, and supportability.

4. PROCEDURES. See Enclosure 2.

5. RELEASABILITY. **Unlimited**. This volume is approved for public release and is available on the Internet from the DoD Issuances Website at <http://www.dtic.mil/whs/directives>.

6. EFFECTIVE DATE. This volume:

a. Is effective February 10, 2014.

b. Must be reissued, cancelled, or certified current within 5 years of its publication to be considered current in accordance with DoD Instruction 5025.01 (Reference (d)).

c. Will expire effective February 10, 2024 and be removed from the DoD Issuances Website if it hasn't been reissued or cancelled in accordance with Reference (d).



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Enclosures

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ENCLOSURE 1

REFERENCES

- (a) DoD 4140.1-R, “DoD Supply Chain Materiel Management Regulation,” May 23, 2003 (cancelled by Volume 1 of this manual)
- (b) DoD Directive 5134.12, “Assistant Secretary of Defense for Logistics and Materiel Readiness (ASD(L&MR)),” May 25, 2000, as amended
- (c) DoD Instruction 4140.01, “DoD Supply Chain Materiel Management Policy,” December 14, 2011
- (d) DoD Instruction 5025.01, “DoD Directives Program,” September 26, 2012, as amended
- (e) DoD Directive 8500.01E, “Information Assurance (IA),” October 24, 2002, as amended
- (f) DoD Instruction 8500.02, “Information Assurance (IA) Implementation,” February 6, 2003
- (g) DoD Instruction 5200.44, “Protection of Mission Critical Functions to Achieve Trusted Systems and Networks,” November 5, 2012
- (h) International Organization for Standardization and the International Electrotechnical Commission 15434, “Information Technology – Automatic Identification and Data Capture Techniques – Syntax for High-Capacity ADC Media,” 2006¹
- (i) International Organization for Standardization and the International Electrotechnical Commission 15418, “Information Technology – GS1 Application Identifiers and MH10 Data Identifiers and Maintenance,” July 18, 2008¹
- (j) International Organization for Standardization and the International Electrotechnical Commission 18000-7, “Information technology – Radio frequency identification for item management – Part 7: Parameters for active air interface communications at 433 MHz,” current edition¹
- (k) American National Standards Institute International Committee for Information Technology Standards 256:2007 Standard, “Information Technology – Radio Frequency Identification (RFID),” 2007¹
- (l) EPCTM Radio-Frequency Identity Protocols Class-1 Generation-2 UHF RFID Protocol for Communications at 860 MHz – 960 MHz, current edition²
- (m) Institute of Electrical and Electronics Engineers 802.11 series of standards, “Wireless Local Area Networks (WLANs)” current edition³
- (n) Federal Information Processing Standards Publication 140-2, “Security Requirements for Cryptographic Modules,” May 25, 2001⁴
- (o) Defense Transportation Regulation 4500.9-R, Part II and III, “Defense Transportation Regulation,” current edition
- (p) Military Standard 129, “Department of Defense Standard Practice, Military Marking for Shipment and Storage,” current edition
- (q) DoD Instruction 5000.02, “Operation of the Defense Acquisition System,” November 25, 2013

¹ Available from <http://webstore.ansi.org/ansidocstore>.

² Available from <http://www.gs1.org/gsmp/kc/epcglobal/uhfc1g2>.

³ Available from <http://ieee802.org>.

⁴ Available from <http://csrc.nist.gov/publications/PubsFIPS.html>.

- (r) DoD 7000.14-R, "Department of Defense Financial Management Regulations (FMRs)," Volumes 1-15, dates vary by volume

ENCLOSURE 2

PROCEDURES

1. DoD SUPPLY CHAIN MATERIEL MANAGEMENT SYSTEMS

a. To ensure a high-performing and agile supply chain, DoD Components will incorporate modern technologies into DoD materiel management to handle materiel management information, automatically identify items in storage and in transit, and analyze process improvements. The DoD Components will:

(1) Implement and maintain modern logistics information systems and technologies and adopt proven new methods, such as unique item identification, to manage information to:

(a) Provide a timely and complete process that satisfies DoD supply chain materiel management requirements.

(b) Coordinate planning and provide for a collaborative and interoperable environment among the DoD Components as well as with commercial partners and suppliers.

(c) Tailor support to operational conditions and mission requirements.

(d) Sustain support while minimizing systems support costs and duplicative efforts.

(2) Design DoD supply chain management information systems to facilitate DoD-wide asset visibility of materiel throughout the DoD supply chain. These systems will:

(a) Use AIT to aid in managing costs, maintaining accountability and control, and implementing the policies and procedures cited in Reference (c).

(b) Provide timely access to accurate, actionable information across logistics processes to enable responsive, protected logistics situational awareness and execution.

(3) Modernize supply chain materiel management systems to improve performance or reduce cost.

(4) Evaluate all modernization initiatives to ensure they will achieve desired operational performance in the DoD supply chain, and not merely represent newer technological capabilities.

(5) Use data standards to ensure interoperability of DoD enterprise automated information systems and enabling technologies.

b. With regard to information management, the DoD Components will:

(1) Assign data ownership that includes responsibility for ensuring data integrity.

(2) Implement an information exchange network to support coordination and collaboration between DoD supply chain functions and activities, including commercial partners.

(3) Incorporate security mechanisms to provide for secure, uncompromised exchange of information in accordance with DoDD 8500.01 (Reference (e)), DoDI 8500.02 (Reference (f)), and DoDI 5200.44 (Reference (g)), where applicable.

(4) Adopt commercial data exchange and user interface standards and procedures, to include Defense logistics management standard systems, while ensuring interoperability and maintaining appropriate security levels.

(5) Ensure availability of information required by supply chain participants to eliminate duplicate records and reconciliation.

(6) Update data elements in real time or near real time as the change occurs or new information becomes available.

(7) Participate fully in the development and implementation of the DoD Global Information Grid (GIG) Enterprise Services (GES) to support the DoD supply chain with capability to:

(a) Allow authorized users to access information from any location transparently and independently of any process application.

(b) Provide functional applications online.

(c) Automate application-driven data calls and facilitate machine-to-machine data sharing through common interfaces.

(d) Provide timely and accurate data access.

(e) Incorporate common operating environment software to minimize the impact on other applications.

(f) Ensure information integrity in a secure network that restricts access to authorized individuals and activities.

(g) Use authoritative data sources.

(h) Assess threats from potential suppliers providing critical supply chain information and communications technology components are in place.

c. With regard to automated materiel management systems, the DoD Components will:

(1) Adopt a strategy of using commercial, off-the-shelf supply chain management applications based on an overarching enterprise framework with common interfaces and common data plan whenever such applications meet their mission requirements. Use enterprise resource planning or equivalent strategies to increase supply chain effectiveness and productivity.

(2) Seek opportunities for inter-DoD Component supply chain management systems development.

(3) Ensure that their materiel management systems collect and disseminate measures of performance and cost metrics that pertain to all organizational levels.

(4) Ensure that their materiel management systems interface with planning, programming, budgeting, and execution system processes to permit cross-referencing and analysis of resource requirements and availability.

(5) Provide automated access to computer-based standard training and learning tools for supply chain managers.

2. AIT. The DoD Components will:

a. Incorporate and maximize the use of machine-readable AIT media and data collection devices in DoD supply chain business processes.

b. Ensure information about materiel entering and moving through the DoD supply chain is in a format that is applicable for use by military and applicable commercial AIT devices.

c. Mark individual item assets with item unique identification (IUID) according to procedures in Volume 9 of this manual. Establish a capability to read Error Correction Code (ECC) 200 Data Matrix symbol in accordance with IUID policy and standards.

d. Establish a capability to read active and passive radio frequency identification (RFID).

e. Use the passive RFID for source data capture to enable the business process where passive RFID is available and integrated with the automated information.

f. Utilize DoD-approved standards and specifications for AIT media, devices, and software.

g. Utilize data syntax and semantics for all high-capacity AIT devices that conform to the International Organization for Standardization and the International Electrotechnical Commission (ISO/IEC) 15434 (Reference (h)) and ISO/IEC 15418 (Reference (i)) standards or other standard subsequently approved and indexed in the DoD Information Technology Standards Registry (DISR).

h. Use the ECC 200 Data Matrix symbol standard for IUID marking.

i. Use ISO/IEC 18000-7 air interface protocol standard (Reference (j)) or other standards subsequently approved and indexed in the DISR for active RFID collection systems. Until the DoD completes the migration to air interface protocol standards as established in Reference (j), active RFID collection systems may conform to the American National Standards Institute International Committee for Information Technology Standards (ANSI INCITS) 256:2007 standard (Reference (k)). When the migration is complete to include NATO and coalition partner use, Reference (k) will no longer be used for communication between active RFID tags and interrogators within the DoD.

j. Conform passive RFID collection systems to the ISO standards for electronic product code (EPC) (Reference (l)). DoD utilizes the standards developed by GS1 to ensure interoperability within DoD and with industry and to improve global supply chains with the use of RFID and the EPC.

k. Conform radio frequency local area network AIT devices to the Institute of Electrical and Electronics Engineers 802.11 series of standards (Reference (m)) and Federal Information Processing Standards Publication 140-2 (Reference (n)).

l. Follow detailed barcode, RFID, and other AIT media procedures in the Defense Transportation Regulation Part II and Part III (Reference (o)) and Military Standard 129 (known as "MIL-STD-129") (Reference (p)).

m. Ensure sufficient RFID infrastructure and equipment are appropriately positioned to support combatant commander requirements for asset visibility. Military and commercial ports will be instrumented with fixed or mobile RFID capability based on volume of activity and duration of the requirement.

n. Forward data from all DoD Component-operated RFID interrogators to the radio frequency-intransit visibility (known as "RF-ITV") system server maintained by Army Program Executive Officer, Enterprise Information Systems (Product Director Automated Movement and Identification Solutions).

3. DoD SUPPLY CHAIN MATERIEL ANALYTICAL CAPABILITIES

a. The DoD Components will use analytical capabilities to:

(1) Identify and track deviations from projected goals for the established DoD supply chain performance metrics and deviations from normal historical or projected patterns in such areas as demand, stock levels, lead times, repair cycles, order and ship times, retention stocks, or prices of materiel or services.

(2) Identify the root cause of problems in DoD supply chain performance.

- (3) Assess costs to acquire, manage, and maintain materiel inventories and costs associated with DoD supply chain operations and analyze cost changes.
 - (4) Simulate proposed process changes or changes in force structure or operations to project their impact on DoD supply chain performance and costs.
 - (5) Use readiness-based sparing (RBS) tools to plan for materiel support to contingency and war time operations.
 - (6) Use RBS tools to assess the impact of reliability, maintainability, or supportability improvements on weapon system readiness.
 - (7) Analyze customer behavior to improve DoD supply chain support by materiel providers.
 - (8) Use continual process improvement methods to assess, develop, and support total life-cycle management processes, initiatives, and emerging information systems.
- b. Although established models and techniques are preferable for reasons of quality and validity, the DoD Components are not limited to the models or techniques that they may use to develop analytical capabilities. All models and techniques used must produce repeatable and verifiable results.
- c. Typical outputs may do one or more of the following:
- (1) Summarize key trends, identify out-of-tolerance conditions, project materiel shortfalls, or highlight other anomalies associated with basic performance or process sizing metrics.
 - (2) Track actual resource use by weapon system, equipment, or supply chain activity and assess reallocation of available resources by weapon system on the basis of changes in priorities and conditions.
 - (3) Forecast readiness trends by weapon system, end equipment, or organization. Use current readiness posture or on the potential changes to projected failures, commanders' future operational plans, and projected acquisition or maintenance production. Provide estimated dates for correcting projected deficiencies.
 - (4) Provide material requirements planning information related to end-to-end movement from theater reception, staging, onward movement, and force integration capacity and constraints.
 - (5) Evaluate "what if" scenarios.
- d. In developing analytical capabilities, the DoD Components will:

(1) Make use of existing information sources, including:

(a) Internal materiel management systems, maintenance information systems, existing data repositories (e.g., Logistics Metrics Analysis Reporting System (LMARS)), operational systems tracking weapon system performance, and the product data repositories cited in paragraph 4 of this enclosure.

(b) External commercial repositories of supply chain benchmarks and metrics.

(2) Train employees to use RBS tools, simulation models, mathematical algorithms, expert systems, artificial intelligence techniques, spreadsheets, statistical packages, and statistical sampling.

4. PRODUCT SUPPORT DATA

a. The DoD Components, or a third party with guaranteed access, will collect and maintain product support data.

(1) Product support data consists of weapon system and equipment program configuration and performance data and technical manuals; weapon system reparable item test, failure, and usage data and repair manuals; weapon system item support cost data; and other data related to the effective management and control of parts, items, equipment, and assets. Product support data supplements item identification or catalog data managed under the provisions of Volume 9 of this manual.

(2) Product support data should be retained in a manner consistent with the product support strategy developed during the weapon system, equipment, or reparable component acquisition phase and life cycle.

(3) For acquisition category (ACAT) I and II programs as described in DoDI 5000.02 (Reference (q)), regardless of the planned sustainment approach, the DoD Components will:

(a) Adopt acquisition strategies that provide for the technical data rights needed to sustain such systems and subsystems over the life cycle.

(b) Acquire and retain rights to technical data in accordance with the program manager's data management strategy.

(4) Product support data users should have online access to product support data, regardless of the geographical location of that data.

b. To warehouse product support data where necessary, the DoD Components will:

(1) Provide for data repositories, data management systems, and related access capabilities.

(2) Control the data management system technical baseline for weapon systems and other equipment (e.g., configuration documentation, technical data, and technical manuals).

c. DoD Components should provide access to product data for:

(1) Weapon system program and force structure information in a secured mode.

(2) Technical and repair manuals, preferably through the use of integrated electronic technical manuals, to promote a flow of information among weapon systems managers and their suppliers, maintainers, and customers.

(3) Current component maintenance data to enable comparative analyses between actual and projected failure rates and reliability performance.

(4) Engineering drawings and related maintenance procedures, maintenance planning data, maintenance resources, provisioning data, and field feedback data.

(5) Engineering change proposals for supply chain impact and coordination implementation and use of technical documentation.

d. The DoD Components will provide the capability to exchange product support information with allies to enhance international interoperability and cooperation.

GLOSSARY

PART I. ABBREVIATIONS AND ACRONYMS

ACAT	acquisition category
AIT	automatic identification technology
ANSI INCITS	American National Standards Institute International Committee for Information Technology Standards
ASD(L&MR)	Assistant Secretary of Defense for Logistics and Materiel Readiness
DISR	DoD Information Technology Standards Registry
ECC	error correction code
EPC	electronic product code
FY	fiscal year
GES	Global Information Grid Enterprise Services
GIG	Global Information Grid
ISO/IEC	International Organization for Standardization and the International Electrotechnical Commission
IUID	item unique identification
MIL-STD	military standard
RBS	readiness-based sparing
RFID	radio frequency identification
RF-ITV	radio frequency-intransit visibility
USD(AT&L)	Under Secretary of Defense for Acquisition, Technology, and Logistics

PART II. DEFINITIONS

These terms and their definitions are for the purpose of this volume and will serve as standard terminology for DoD supply chain materiel management.

active RFID tag. A radio frequency tag device that has the ability to produce its own radio signal not derived from an external radio source. Active RFID tags may hold relatively large amounts of data, are continuously powered, and are normally used when a longer tag read distance is desired.

AIT. A suite of technologies enabling the automatic capture of data, thereby enhancing the ability to identify, track, document, and control assets (e.g., materiel), and deploying and

redeploying forces, equipment, personnel, and sustainment cargo. AIT encompasses a variety of data storage or carrier technologies such as linear bar codes, two-dimensional symbols (e.g., PDF417 and data matrix), magnetic strips, integrated circuit cards, or satellite tracking transponders and RFID tags used for marking or tagging individual items, equipment, air pallets, or containers. AIT is also referred to commercially as automatic identification data capture.

ANSI INCITS 256. A standard identified by the International Committee for Information Technology Standards in the American National Standards Institute. ANSI INCITS establishes a technical standard for a family of compatible information technology devices, specifically RFID devices, which are designed to operate in freely available international frequency bands at license-free power levels. The standards promote interoperability and compatibility between RFID devices by defining a common application program interface and limited physical and data link layer options.

assembly. In logistics, an item forming a portion of equipment that can be provisioned and replaced as an entity and which normally incorporates replaceable parts or groups of parts.

demand. An indication of a requirement, a requisition or similar request for an item of supply or individual item. Demands are categorized as either recurring or non-recurring.

EPC. A product numbering scheme that can provide unique identification for physical objects, assemblies, and systems. Information is not stored directly within the code; rather, the code serves as a reference for networked (or Internet-based) information. The EPC is considered an extended form of the existing Universal Product Code or European Article Number, currently used by manufacturers to identify products. The standardized EPC data consists of an EPC (or EPC Identifier) that uniquely identifies an individual object, as well as an optional filter value when judged to be necessary to enable effective and efficient reading of the EPC tags. In addition to this standardized data, certain classes of EPC tags will allow user-defined data. The GS1 EPCglobal tag data specifications define the length and position of this data, without defining its content.

EPCglobal. A neutral, not-for-profit industry organization representing more than 500 global commerce leaders in the United States, who together are focused on improving global supply chains by use of RFID and the EPC. EPCglobal USTM is part of GS1 US (www.gs1us.org), the most widely used supply chain standards system in the world.

GES. The GES consists of core enterprise services for the net-centric capabilities provided by the Defense Information Systems Agency.

GIG. The globally interconnected, end-to-end set of information capabilities, associated processes and personnel for collecting, processing, storing, disseminating, and managing information on demand to warfighters, policy makers, and support personnel. The GIG includes owned and leased communications and computing systems and services, software (including applications), data, security services, other associated services and national security systems.

GS1. A neutral, not-for-profit industry organization representing more than 500 global commerce leaders in the United States, who together are focused on improving global supply chains by use of RFID and the EPC. GS1 EPCglobal is part of GS1, the most widely used supply chain standards system in the world.

individual item. A single instance of a stock-numbered item, a single assembly, or a single subassembly.

inventory. Materiel, titled to the U.S. Government, held for sale or issue, held for repair, or held pending transfer to disposal. This definition covers the same population of items as the definition for inventory in the Financial Management Regulation (FMR) Chapter 4 (Inventory and Related Property) of Volume 4 of DoD 7000.14-R (Reference (r)). Inventory does not include tangible personal property to be consumed in normal operations, operating materials and supplies as defined by Reference (r).

item identification. A collection and compilation of data to establish the essential characteristics of an item that give the item its unique character and differentiate it from other supply items.

IUID. A system of establishing globally common unique identifiers on items of supply within the DoD, which serves to distinguish a discrete entity or relationship from other like and unlike entities or relationships. AIT is used to capture and communicate IUID information.

major system. An acquisition program:

Estimated by the DoD Component head to require eventual expenditure for research, development, test, and evaluation of more than \$140 million in fiscal year (FY) 2000 constant dollars, or for procurement of more than \$660 million in FY 2000 constant dollars; or

Designated by a DoD Component head as ACAT II.

marking. The application of legible numbers, letters, labels, tags, symbols, or colors to ensure proper handling and identification during shipment and storage.

materiel management. Continuing actions relating to planning, organizing, directing, coordinating, controlling, and evaluating the application of resources to ensure the effective and economical support of military forces. It includes provisioning, cataloging, requirements determinations, demand and supply planning, acquisition, distribution, maintenance, and disposal of materiel. The terms “materiel management,” “materiel control,” “inventory control,” “inventory management,” and supply management” are synonymous.

materiel manager. Any DoD activity or agency that has been assigned materiel management responsibilities for the DoD and participating federal agencies. The term includes responsibilities performed by either wholesale materiel managers or retail materiel managers: managing, cataloging, demand and supply planning, requirements determination, procurement, distribution, overhaul and repair of repairable materiel, and disposal of materiel.

passive RFID tag. A passive radio frequency tag that reflects energy from the reader or interrogator, or that receives and temporarily stores a small amount of energy from the reader and interrogator signal to generate the tag response.

provisioning. The management process of determining and acquiring the range and quantity of support items necessary to operate and maintain an end item of materiel for an initial period of service.

RBS. A requirement determination process that computes the levels of secondary item spares needed to support a weapon system readiness goal at least cost. Synonymous with “readiness-based requirements” and “sparing-to-availability.”

RBS tool. An analytical capability primarily used to set sparing levels. Examples of other applications that an RBS tool can support include:

- Assessing the inventory investment required for the fielding of a new program (e.g., weapon system or subsystem).

- Negotiating supplier performance based logistics agreements.

- Assessing the impact of reliability, maintainability, or supportability improvements on weapon system readiness.

- Planning and developing budgets.

- Conducting what-if exercises related to deployments.

readiness. A measure or measures of the ability of a system to undertake and sustain a specified set of missions at planned peacetime and wartime utilization rates. Examples of system readiness measures are combat sortie rate, fully mission capable rate, and operational availability. Measures take account of:

- The effects of system design, reliability, maintainability.

- The characteristics of the support system.

- The quantity and location of support resources.

reparable item. An item of supply subject to economical repair and for which the repair (at either depot or field level) is considered in satisfying computed requirements at any inventory level.

supplier. Organic or commercial sources for items of supply.

supply chain. The linked activities associated with providing materiel from a raw material stage to an end user as a finished product.

supply chain management. The integrated process of supply chain materiel management begins with planning the acquisition of customer-driven materiel requirements for commercial sources and ends with the delivery of materiel to operational customers. It includes the materiel returns segment of the process, the flow of reparable materiel to and from maintenance facilities, and the flow of required information in both directions among suppliers, logistics managers, and customers.

technical data. Recorded information used to define a design and to produce, support, maintain, or operate the system or subsystem. Rights to data is acquired and retained in accordance with the program manager's data management strategy.

unique item identifier. A set of data elements marked on items that is globally unique and unambiguous. The term includes a concatenated unique item identifier or a DoD recognized unique identification equivalent.