

Supply Chain Metrics Guide

March 3, 2016



A Message from the Assistant Secretary of Defense

for Logistics and Materiel Readiness

The Department of Defense (DoD) Supply Chain Metrics Guide is the main source for detailed information on the supply chain metrics used by the Department. As called out by DoD supply chain materiel management procedures in DoD Manual 4140.01, the Guide addresses the key attributes the Department expects of its supply chain and the metrics that reflect performance against those attributes. The content of this Guide is of value to logistics managers, practitioners, analysts, and others interested in how the Department measures and monitors supply chain performance. In addition, it explains how the metrics are used to assess the sustainment of the Department's materiel support program.

The Guide provides a description of each metric and how it is used to assess supply chain performance throughout the DoD enterprise. The metrics in this guide include enterprise level metrics that cross supply chain functions to describe the overall effectiveness of the supply chain. The Guide also includes functional level metrics that measure performance specific to the functions of inventory management and distribution management.

The DoD Supply Chain Metrics Guide is the result of collaboration with the military departments, the Defense Logistics Agency, and the U.S. Transportation Command through the Supply Chain Metrics Group and the Supply Chain Executive Steering Committee. As the DoD supply chain transforms to meet future customer requirements and adopts new business practices, the metrics in this Guide will be updated.

The metrics in this Guide cover the end-to-end performance of the DoD supply chain while emphasizing performance in inventory and distribution management. It documents the suite of metrics used to maintain oversight of materiel support to the warfighter. We welcome your feedback and experiences as you put it into practice, and we will incorporate that input into future editions.

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Executive Summary

Executive Summary

The performance of the DoD supply chain is essential to warfighter readiness. To monitor that performance, the Office of Deputy Assistant Secretary of Defense for Supply Chain Integration (ODASD[SCI]), in coordination with the military departments and the Defense Logistics Agency (DLA), adopted a comprehensive suite of supply chain metrics for Department-wide use. The metrics were selected to (1) assess the effectiveness and efficiency of the DoD supply chain enterprise and (2) measure the success of major initiatives to improve inventory and distribution management within the enterprise. These metrics evaluate the degree to which the DoD supply chain exhibits the attributes of responsiveness to customer requests, reliability of the internal processes, and consideration of supply chain costs and customers' supply chain expenditures, while ensuring necessary and appropriate planning and precision in support of materiel readiness.

These metrics create a framework whereby the Department works collaboratively with supply chain stakeholders to

- track supply chain performance against established goals and targeted trends;
- identify negative performance trends or anomalies and begin development of corrective actions;
- evaluate performance results from efforts designed to improve DoD supply chain processes; and
- establish policy changes to improve supply chain performance.

This Guide presents a comprehensive description of each metric, including its definition, business value, goals, and targeted performance trends. Detailed explanations of the computations for each metric and key relationships to other metrics are included. The Guide also provides direction on the reporting of each metric and on the manner in which the metric should be displayed and used. In addition, the Guide includes separate sections to cover the following:

- The selection criteria for metrics to evaluate the success of major improvement initiatives.
- The relationship of enterprise metrics to major supply chain attributes and how they measure the degree to which the supply chain is exhibiting those attributes.
- The use of supply chain metrics to monitor and assess performance against the business objectives of
 - o sustaining weapon system support to the nation's military forces,
 - o improving overall inventory management,
 - o improving distribution effectiveness,
 - o improving asset visibility and accessibility,
 - o providing an integrated enterprise view, and
 - promoting awareness of strategic supply chain goals.

In summary, this Guide serves as a reference for the comprehensive, standardized set of DoD-wide supply chain metrics and their recommended use to monitor DoD supply chain performance.

Contents

Executive Summary	ix
An Introduction to the DoD Supply Chain Metrics Guide	
Guide Content	
Major Sections	
Metric Descriptions and Instructions	
Appendices	2
Purpose of the Guide	
Development–Selection Criteria	
Metrics Associated With Assessing Supply Chain Performance	
Metrics Associated With Supply Chain Improvement Initiatives	
Metrics and Supply Chain Attributes	4
Attributes and Strategic Business Goals	5
Metrics by Attribute	6
Guide Updates	7
Using Metrics	11
Using Metrics to Monitor Weapon System Support to Warfighters	
Using Metrics to Track Inventory Management Improvements	13
Using Metrics to Monitor Distribution Effectiveness	
Using Metrics to Track the Impact of Improved Asset Visibility and Accessibility	20
Using Metrics to Explore and Explain a Performance Problem: An Example	22
Enterprise Level Metrics	27
Materiel Readiness Metrics	
Description	
Not Mission Capable (NMC) Rates	
Not Mission Capable Supply (NMCS) Backorders	32
Responsiveness Metrics	35
Description	
Logistics Despanse Time (LPT)	
Response Time Effectiveness	
Deliebility Metrice	
Description	47 47
Time Definite Delivery (TDD) Compliance	
Wholesale Perfect Order Fulfillment	
Wholesale Supply Availability	53
Materiel Denial Rates	57
Cost Metrics	61
Description	61
Logistics Cost Baseline	
Value of Secondary Item Inventory	
Tiered Inventory Turns	

Supply Management Costs Supply Management Cost Changes	71 73
Planning and Precision Metrics	
Description	
Excess Un-Hand	
Due-III Potential Future Excess	
Unserviceable DLR Return Times	
Unserviceable DLR Over-Aged Due-Ins	
Procurement Lead Time	
Procurement Lead Time Variance	
Metrics Associated with Improving Inventory Management	
Inventory Management Metrics by Desired Outcome	
Desired Outcome for Total Asset Visibility	
Desired Outcome for Economic Retention	
Desired Outcome for Contingency Retention	
Desired Outcome for Storage and Direct Vendor Delivery	
Desired Outcome for Items with No Demand	
Desired Outcome for Disposition of Potential Reutilization Stock	
Desired Outcomes for Other Inventory Improvement Actions	
Inventory Accessibility	
Use of Inventory Accessibility	
Development of Inventory Accessibility	
Relationships with Other Metrics	
	111
ERS as a Percentage of Total Inventory.	
Development of FRS as a Percentage of Total Inventory	
Description of ERS as a Percentage of Total Inventory	
Relationships with Other Metrics	
Economic Bonofit of EDS	112
Use of Economic Benefit of ERS	
Development of Economic Benefit of ERS	
Description of Economic Benefit of ERS	
Relationships with Other Metrics	
CRS as a Percentage of Total Inventory	115
Use of CRS as A Percentage of Total Inventory	
Development of CRS as a Percentage of Total Inventory	
Description of CRS as a Percentage of Total Inventory	
Relationships with Other Metrics	
CRS Reason Codes	
Use of the CRS Reason Codes	
Development of CRS Reason Codes	
Description of CRS Reason Codes	
Relationships with Other Metrics	
Secondary Item Storage Costs-Distribution Depot	
Use of Secondary Item Storage Costs-Distribution Depot	

Table of Contents

Development of Secondary Item Storage Costs—Distribution Depot Description of Secondary Item Storage Costs–Distribution Depot	
Relationships with Other Metrics	
Secondary Item Storage Footprint	
Use of Secondary Item Storage Footprint	
Development of Secondary Item Storage Footprint.	
Relationshing with Other Metrics	
Value of langest second the 0.10. Value of Na Daman d	124
Value of Inventory with 0-10+ Years of No Demand.	
Development of Value of Inventory with $0-10+$ Years of No Demand	
Description of Value of Inventory with $0-10+$ Years of No Demand	
Relationships with Other Metrics	
PRS Reviewed and Sent to Disposal	125
Use of the PRS Reviewed and Sent To Disposal	
Development of PRS Reviewed and Sent to Disposal	
Description of PRS Reviewed and Sent to Disposal	
Relationships with Other Metrics	
Disposal Value of Serviceable and Unserviceable Reparable and Consumable Item Use of the Disposal Value of Serviceable and Unserviceable Reparable and Cons Metric	s 127 Sumable Items
Items	1 Consumable
Description of Disposal Value of Serviceable and Unserviceable Reparable and Olympiceable And	Consumable
Relationships with Other Metrics	
AAO Stocks as a Percentage of Total Inventory	
Use of AAO Stocks as a Percentage of Total Inventory	
Development of AAO Stocks as a Percentage of Total Inventory	
Description of AAO Stocks as a Percentage of Total Inventory	
Relationships with Other Metrics	
AAO Inventory Segmentation	
Use of AAO Inventory Segmentation	
Development of AAO Inventory Segmentation	
Description of AAO Inventory Segmentation	
Relationships with Other Metrics	
Metrics Associated with Improving Distribution Effectiveness	
DLA Logistics Response Time	
Use of the DLA Logistics Response Time	
Development of DLA Logistics Response Time	
Description of DLA Logistics Response Time	
Relationships with other Metrics	
DLA Wholesale Supply Availability	
Use of the DLA Wholesale Supply Availability	
Development of DLA Wholesale Supply Availability	
Relationshins with Other Metrics	

Supply Chain Metrics Guide

DLA Backorders to Services	144
Use of the DLA Backorders to Services	
Development of DLA Backorders to Services	
Description of DLA Backorders to Services	
Net Effectiveness	
Use of the Net Effectiveness	
Development of Net Effectiveness	
Relationships with Other Metrics	
	1 40
Attrition Net Effectiveness	
Development of Attrition Net Effectiveness	
Description of Attrition Net Effectiveness	
Relationships with Other Metrics	
Cross Effectiveness	151
GIOSS Effectiveness	
Development of Gross Effectiveness	151
Description of Gross Effectiveness	
Relationships with Other Metrics	
Lateral Redistribution	152
Use of Lateral Redistribution	
Development of Lateral Redistribution	
Description of Lateral Redistribution	153
Relationships with Other Metrics	154
Procurement Offset	
Use of Procurement Offset	154
Development of Procurement Offset	155
Description of Procurement Offset	155
Relationships with Other Metrics	155
Routing Identifier Code (RIC) Participation	155
Use of RIC Participation	155
Development of RIC Participation	
Description of RIC Participation	
Relationships with Other Metrics	
Appendix A. Criteria 2 and 3 for Selection of Enterprise Metrics	A-1
Criterion 2. Metrics and Supply Processes	A-1
Criterion 3. Desired Behaviors and Metrics	A-3
Supply Chain Objective	A-3
Desired Behavior	A-3
Metric – How It Supports Desired Behavior	A-3
Appendix B. Enterprise Metrics Data Submission Requirements	B-1
Appendix C. Abbreviations	C-1
Appendix D. Definitions	D-1

Figures

Figure 1. Supply Chain Strategic Objectives	3
Figure 2. Integrated Relationships between Supply Chain Metrics	4
Figure 3. Strategic Goals and Metrics Analytical Framework	5
Figure 4. DoD Supply Chain Metrics Framework	6
Figure 5. The Role of the Customer Wait Time	11
Figure 6. Not Mission Capable Rates for Major Weapon System Groups	12
Figure 7. Response Time Effectiveness	12
Figure 8. Not Mission Capable Supply Backorders	13
Figure 9. Secondary Item Inventory Changes	13
Figure 10. Government Managed Excess On-Hand	14
Figure 11. Due-In Long Supply	15
Figure 12. Forecast Accuracy	16
Figure 13. Forecast Bias	16
Figure 14. Procurement Lead Time Variances	17
Figure 15. Requirements for Improved Distribution Effectiveness	18
Figure 16. Logistics Response Time Across Services	
Figure 17. Gross Effectiveness across the Services (OCONUS)	19
Figure 18. Attrition Net Effectiveness across the Services (CONUS)	20
Figure 19. Effects of Improved Asset Visibility and Accessibility	20
Figure 20. DoD-wide Inventory Accessibility	21
Figure 21. Lateral Redistribution and Procurement Offset Savings	21
Figure 22. DLA Supply Availability and Backorder Metrics	22
Figure 23. Problem Measurements	22
Figure 24. Drilling Down with a Diagnostic Metric	23
Figure 25. Assessments from NMC Rate Graphs	29
Figure 26. General Display for Not Mission Capable Rates	31
Figure 27. Assessments from NMCS Backorder Graphs	32
Figure 28. General Display for Not Mission Capable Supply Backorders	34
Figure 29. Assessments from CWT _{OM} Graphs	36
Figure 30 General Display for Customer Wait Time for Organizational Maintenance	38
Figure 31. Assessments from LRT Graphs	39
Figure 32. General Display for Logistics Response Time	41
Figure 33. Assessments from Response Time Effectiveness Graphs	42
Figure 34. More Assessments from Response Time Effectiveness Graphs	43
Figure 35. General Display for Response Time Effectiveness	44
Figure 36. Assessments from TDD Compliance Graphs	48
Figure 37. Assessments from TDD Compliance Graphs	49
Figure 38. Information Shown on POF Graph	50
Figure 39. DoD Perfect Order Fulfillment	52
Figure 40. Information Shown on Wholesale Supply Availability Graph	54
Figure 41. General Display for Wholesale Supply Availability	55
Figure 42. Assessment from Materiel Denial Rate Graphs	58
Figure 43. General Display for Materiel Denial Rate	59
Figure 44. Information Shown on Logistics Cost Baseline Graph	62
Figure 45. Assessments from Inventory Value Graphs	64
Figure 46. Information Shown on Inventory Value Graph	65
Figure 47. Information Shown on Graph of Inventory Segmentation of No Demand Items	67
Figure 48. Sales Based Inventory Turn.	69
Figure 49. General Display for Tiered Inventory Turns	70

Figure 50. Information Shown on Supply Management Costs Graph	71
Figure 51, General Display for Supply Management Costs	73
Figure 52. Information Shown on Supply Management Cost Changes Graph	74
Figure 53. General Display for Supply Management Cost Changes	76
Figure 54. Assessments from Excess On-Hand Graph	
Figure 55. General Display for Excess On-Hand	80
Figure 56. Assessments from Due-In Potential Future Excess Graph	
Figure 57. Information Shown on Due-In Long Supply Graph	
Figure 58. General Display for Due-In Long Supply	
Figure 59. Assessments from Forecast Accuracy Graph	
Figure 60. Assessments from Forecast Bias Graphs	
Figure 61. General Display for Forecast Accuracy and Forecast Bias	
Figure 62. DoD-wide Item and Dollar Demand Accuracy Distributions	
Figure 63. Forecast Accuracy and Bias Value-Added Measurements	
Figure 64. Assessments from Unserviceable DLR Return Times Graph	
Figure 65. General Display for Unserviceable DLR Return Time	
Figure 66. Assessment from Unserviceable DLR Over-Aged Due-Ins Graph	
Figure 67. General Display for Unserviceable DLR Returns Over-Aged Due-Ins	
Figure 68. Assessments from Procurement Lead Time Graph	
Figure 69. General Display for Procurement Lead Time	
Figure 70. Assessments from Lead Time Variance Graph	
Figure 71. General Display of Lead Time Variance	
Figure 72. Information Shown in Inventory Accessibility Graphs	
Figure 73. Information Shown on ERS Percentage Graph	
Figure 74. General Display for ERS as a Percentage of Total Inventory	
Figure 75. Information Shown in ERS Economic Benefit Table	
Figure 76. Information Shown in CRS Percentage Graph	
Figure 77. General Display for CRS as a Percentage of Total Inventory	
Figure 78. Information Shown in CRS Reason Code Graph	
Figure 79. Information Shown in Storage Costs Graph	
Figure 80. Information Shown on Storage Footprint Graph	
Figure 81. Information Shown on 0–10+ Years with No Demand Graph	
Figure 82. Information Shown in PRS Reviewed and Sent to Disposal Graph	
Figure 83. Information Shown in the Disposal Value Graph	128
Figure 84. Information Shown in AAO Percentage Graph	129
Figure 85. General Display for AAO Stocks as a Percentage of Inventory	131
Figure 86 Information Shown in AAO Segmentation Granh	133
Figure 87. Assessment from DLA Logistics Response Time Graph	138
Figure 88 General Display for DLA Logistics Response Time	140
Figure 89 Information Shown in DLA Supply Availability Granh	142
Figure 90 General Display for DLA Supply Availability	143
Figure 91 Information Shown in DLA Backorders Granh	145
Figure 92 General Display for DLA Backorders	146
Figure 92. Information Shown in Net Effectiveness Granh	147
Figure 94 Information Shown in Attrition Net Effectiveness Graph	149
Figure 95 Information Shown in Gross Effectiveness Granh	151
Figure 96 Information Shown in Lateral Redistribution Graph	
Figure 97 Information Shown in Procurement Offset Granh	
Figure 98 Information Shown in RIC Participation Graph	154 156
i igure 20. miormaton snown in Ric i ai ucipation di apit	

Introduction

An Introduction to the DoD Supply Chain Metrics Guide

The DoD Supply Chain Metrics Guide was developed to provide DoD personnel with information on a standardized set of DoD-wide supply chain metrics for monitoring the health and performance of the DoD supply chain. Those metrics include enterprise level metrics that cross supply chain functions to describe the overall effectiveness of the DoD supply chain as well as functional level metrics that measure performance specific to the supply chain functions of inventory management and distribution management.

Guide Content

This introduction describes:

- The purpose of the guide
- The criteria used to select and develop the metrics in the guide
- How supply chain attributes serve as the analytical framework for the metrics in the guide.

Major Sections

This introduction is followed by sections that address the following:

- Metrics usage (how supply chain managers use the metrics to track performance and drive behavior)
- Enterprise level metrics by supply chain attribute, including
 - o definitions for each enterprise metric,
 - o comprehensive instructions on how to measure and use each metric, and
 - charts showing the measures over time.
- Functional level metrics associated with improving inventory management (with associated instructions and charts)
- Functional level metrics associated with improving distribution management (with associated instructions and charts)
- Appendices A through D.

Metric Descriptions and Instructions

For each metric in the enterprise and functional metrics sections, the Guide contains a comprehensive description of the metric and instructions on how it is measured and how it should be used. These items are highlighted:

- Use
- Definition
- Business value
- Office of the Secretary of Defense (OSD) data requirements (i.e., frequency and content of submission)

Supply Chain Metrics Guide

- Goals and trend analysis (i.e., performance goals and criteria for evaluating trends)
- Computational rules
- Interactions with other related metrics.

The instructions for each metric end with the direct relationships/interactions that metric has with other metrics. The cumulative sum of those relationships provides for an integrated view of the performance of the DoD supply chain.

Appendices

Appendix A displays the results of applying selection criteria to the established enterprise metrics.

Appendix B summarizes the data submission requirements for the supply chain enterprise metrics.

Appendix C defines acronyms used in the Guide.

Appendix D contains definitions of terms used in the Guide.

Purpose of the Guide

The Guide supplements DoD guidance on supply chain metrics contained in DoD Manual (DoDM) 4140.01, *Supply Chain Materiel Management Procedures* by describing

- how the metrics in the Guide were selected and how they relate to supply chain attributes;
- how the metrics are used to track performance against DoD supply chain goals;
- how each metric is defined, computed, displayed, and used; and
- the metric's business value and relationships with other metrics.

The metrics in this guide are collected and monitored by the DoD logistics community. For the purposes of this Guide, the DoD Supply Chain Community is defined as the military services, DLA, USTRANSCOM, the Supply Chain Metrics Working Group, the Supply Chain Executive Steering Committee (SCESC), and ODASD(SCI).

Development-Selection Criteria

The DoD Supply Chain Metrics Group (SCMG)¹ was responsible for developing the supply chain enterprise metrics in the Guide. The criteria used by the SCMG to select metrics are discussed in what follows.

Metrics Associated With Assessing Supply Chain Performance

Five criteria were used to establish enterprise level metrics for assessing the performance of the DoD supply chain:

1. Do the metrics monitor the execution of actions that achieve enterprise strategic objectives? First, the SCMG developed supply chain strategic objectives from the existing goals within the 2010 DoD Logistics Strategic Plan, as shown in Figure 1.²

¹ The SCMG is chaired by the Office of Deputy Assistant Secretary of Defense for Supply Chain Integration and has members from the military services, the Defense Logistics Agency, the U.S. Transportation Command, the U.S. Special Forces Command, and the General Services Administration.

² The Logistics Strategic Plan was published in July 2010. The four goals within the Plan supported both the 2010 Quadrennial Defense Review's objectives and the DoD Strategic Management Plan's business priorities, outcomes, and goals.

An Introduction to the DoD Supply Chain Metrics Guide

Metrics were mapped to associated objectives. Metrics were selected that would aid in monitoring the execution of actions to achieve the supply chain strategic objectives.³



Figure 1. Supply Chain Strategic Objectives

- 2. Do the metrics make sense and align with the processes addressed in DoD supply chain guidance? Metrics were cross-referenced to DoD supply chain guidance outlined in the DoD 4140.01 Instruction and Manual. The major supply chain processes of plan, source, make/maintain, deliver, and return are cited within that guidance. Within those processes, specific procedures are given for associated organizational elements of the supply chain. See Appendix A for the related policy process, specific procedures and organizational elements, and rationale for each enterprise metric.
- 3. *Do the metrics drive behavior that supports logistics goals?* Desired behaviors were identified using the supply chain strategic objectives determined in Criterion 1. The identification focused on behaviors that optimize the results of actions to achieve the associated objective. As described in Appendix A under Criterion 3, metrics were selected that aligned with a desired behavior under a supply chain strategy objective.
- 4. Do the metrics in the aggregate reflect the supply chain enterprise completely and span all DoD supply chain activities? Developed by the SCMG, Figure 2 portrays a simplified end-to-end view of the DoD supply chain, and shows the integrated relationships between supply chain activities and enterprise level metrics. All metrics are being collected from the DoD Components and aggregated to a DoD metric, where appropriate. The enterprise-wide use of these metrics is prescribed in Volume 10 of DoDM 4140.01.

³ The development section of the description for each enterprise metric shows the supply chain strategic objective that the metric maps to.



Figure 2. Integrated Relationships between Supply Chain Enterprise Metrics

5. *Do the metrics align with metrics reviewed across the enterprise?* Metrics were crossreferenced against those used by senior leadership within the DoD Components to measure and monitor supply chain performance.

Metrics Associated With Supply Chain Improvement Initiatives

In addition to supply chain enterprise metrics, the Guide contains two sets of functional level metrics dealing with two supply chain improvement initiatives. The first initiative is the Comprehensive Inventory Management Improvement Plan (CIMIP), which grew out of a FY2010 National Defense Authorization Act requirement. It is a major initiative to reduce secondary inventory excesses through improvements in processes, metrics, and performance goals from demand forecasting to disposal identification. The targeted CIMIP improvement areas include actions, milestones, targets, and measures of success. In the Guide, CIMIP metrics such as excess on-order and due-in long supply can be found in the section on enterprise level metrics while other CIMIP metrics such as economic retention stocks as a percentage of total inventory are in the section on functional level metrics for inventory management.

The second initiative is improved distribution management, which covers the storage and shipment of materiel. In the Guide, distribution metrics such as logistics response time and materiel denial rates can be found in the section on enterprise level metrics while other distribution metrics such as net and gross depot effectiveness are in the section on functional level metrics for distribution management.

Metrics and Supply Chain Attributes

To provide an analytical framework for presenting the metrics, this Guide links each metric to one of the following desired attributes for DoD supply chain management:

- 1. *Materiel readiness*—the ability of the supply chain to support weapon systems in undertaking and sustaining their assigned missions at planned peacetime and wartime utilization rates. Supporting materiel readiness is the mission imperative of the end-to-end DoD supply chain.
- 2. *Reliability*—the dependability and consistency of the supply chain providers to deliver required materiel support at a time and place specified by the customer. Reliability is key to DoD customer confidence in the DoD supply chain. This attribute focuses on how well the supply chain processes are being executed.
- 3. *Responsiveness*—the ability of the DoD supply chain to respond to customer materiel requests by providing the right support when and where it is needed. For DoD, responsiveness is the speed at which the DoD supply chain fulfills warfighter needs. This attribute is most representative of the customer's perspective of the DoD supply chain.
- 4. *Cost*—the price paid for the supply chain resources required to deliver a specific performance outcome. Cost effectiveness is key to right-sizing the DoD inventory investment and controlling supply chain costs. This attribute is an implied constraint on supply chain operations; it evaluates the DoD investment in the supply chain and assesses financial effects on supply chain customers.
- 5. *Planning and precision*—the ability of the supply chain to accurately anticipate customer requirements and plan, coordinate, and execute accordingly. Planning and precision are key to DoD supply chain management. Their effectiveness affects all other attributes.

Attributes and Strategic Business Goals

Metrics, in general, focus on the enterprise business objectives and the progress used to achieve those objectives. The 2013 Defense Strategic Management Plan laid out seven business goals for the Department. Goal #6 was to "re-engineer or use end-to-end business processes to reduce transaction times, drive down costs, and improve service."⁴ Figure 3 shows how the analytical framework for DoD supply chain metrics supports the three components of that Department business goal.





⁴ DoD Strategic Management Plan, 2012-2013, Business Goal 6 monitored by the DoD Deputy Chief Management Officer with the AT&L key initiative: Improve the supply chain end-to-end process.

Metrics by Attribute

Figure 4 gives the attribute framework and where each enterprise and functional level metric is located within that framework. Each metric is characterized according to the following:

- The supply chain attribute it supports.
- Its overall orientation (outcome or diagnostic or measure of success). A metric is outcomeoriented if it measures the result of how the supply chain is performing. A metric is diagnostic if it measures a factor contributing to an outcome.
- Inventory management functional level metrics. Several metrics associated with improving inventory management measure one of the following major inventory segments:
 - Approved acquisition objective (AAO)—the total authorized requirements for an item of supply.
 - Economic retention stock (ERS)—inventory that is more economical to retain than to dispose and later repurchase.
 - Contingency retention stock (CRS)—inventory retained in case of specific contingency need.
 - Potential reutilization stock (PRS)—inventory above AAO requirements and retention stocks identified for potential reuse.
- Distribution management functional level metrics. Several metrics associated with improving distribution effectiveness measure DLA's role in distribution management.

	Enterprise level metrics		Functional level metrics	
Attribute	Outcome metrics	Diagnostic metrics	Inventory Management	Distribution Management
Materiel readiness	 Not mission capable (NMC) rates 	 NMC supply (NMCS) backorders 		
Reliability	 TDD compliance 	 Wholesale perfect order fulfillment (POF) Wholesale supply availability Materiel denial rates 		 DLA wholesale supply availability DLA backorders
Responsive -ness	 Customer wait time (organizational level) 	 Logistics response time (LRT) Response time effectiveness 		 DLA logistics response time (LRT)
Cost	 Log cost baseline Value of secondary item inventory 	 Inventory segmentation of no demand items Tiered inventory turns Supply management costs Supply management cost changes 	 ERS as a percentage of total inventory Economic benefit of ERS CRS as a percentage of total inventory Secondary item stockage costs and stockage footprint Inventory dollars with 0–10+ years of no demand PRS reviewed and sent to disposal 	 DLA value of inventory Lateral redistribution Procurement offset Lateral Redistribution Procurement Offset

Figure 4. DoD Supply Chain Metrics Framework

An Introduction to the DoD Supply Chain Metrics Guide

	Enterprise level metrics		Functional level	metrics
Attribute	Outcome metrics	Diagnostic metrics	Inventory Management	Distribution Management
			 Disposal value of serviceable and unserviceable reparable and consumable items AAO as a percentage of total inventory 	
Planning and Precision	 Excess on- hand Due-in potential future excess 	 Demand forecast error and bias Unserviceable DLR return time Unserviceable DLR over- aged due-ins Procurement lead time Procurement lead time variance 	 Inventory accessibility CRS reason codes AAO breakout by category 	 Net effectiveness Attrition net effectiveness Gross effectiveness

Figure 4. DoD Supply Chain Metrics Framework

The metrics in Figure 4 are either external or internal to supply chain management processes.

- Data for an external supply chain metric is collected outside of the DoD supply chain. External metrics address the impact of supply chain planning and execution on the customer.
- Data for an internal supply chain metric is collected within the DoD supply chain. Internal metrics are used to evaluate processes within the supply chain, and are a measure of DoD supply chain performance from the perspective of a supply chain manager.

Guide Updates

This Guide will be updated as the metrics under development are completed, or as changes to measures of supply chain business processes or goals become necessary

Using Metrics

Using Metrics

Supply chain managers use metrics to track performance and drive behavior. Metrics provide an objective approach to analyzing key elements of the supply chain by making available quantitative measures of how well the supply chain is performing. By highlighting problem areas and opportunities for improvement, these measures offer insight into how supply chain managers should proceed. Analysis and use of performance information is the foundation for objective decision making within the DoD supply chain.

This section provides examples of how supply chain managers currently use metrics to track performance and drive behavior. A comprehensive description of each metric identified in this section is provided in one of the subsequent sections to include its use, definition, business value, data requirements, goals and trend analysis, computational rules, and interactions with other related metrics. This section closes with an example of how to use metrics data as a guide to exploring and explaining performance problems.

Using Metrics to Monitor Weapon System Support to Warfighters

A weapon system is ready to perform its mission when all of its mission-related components are functioning. When components fail, weapon system maintainers depend on the supply chain to provide replacements to get the weapon system ready. As illustrated in Figure 5, the customer wait time (CWT) measures the time it takes to order and receive a replacement component or part.



Figure 5. The Role of the Customer Wait Time

CWT is the key enterprise metric used to evaluate the responsiveness of the supply chain to customers who are maintaining the readiness of weapon systems.

The outcome measures of weapon system readiness are mission capable rates; however, the analysis of supply chain support to weapon system readiness is served by evaluating not mission capable (NMC) rates. NMC rates are used to evaluate the supply chain's effectiveness because the effects of supply and maintenance can be identified separately using the NMC sub-metrics of NMC-Supply (NMCS) rates and NMC-Maintenance (NMCM) rates. NMC rates quantify the percentage of time weapon systems are not ready to perform their assigned missions. The rates are computed by weapon system operators external to the DoD supply chain and serve as an independent validation of the materiel support provided to weapon systems. As shown in Figure 6, the rates are first reviewed at the major weapon system group level. Any negative trend or anomaly is then diagnosed at the weapon systems level, when rates are reviewed for both supply- and maintenance-related events that would cause a weapon system to be in an inoperable status.



Figure 6. Not Mission Capable Rates for Major Weapon System Groups

If supply-related rates or CWT indicate a problem, two other metrics are used to identify drivers of poor supply. The first metric is response time effectiveness, which breaks CWT into replacement items coming from (1) the retail level of supply, (2) the wholesale level of supply, or (3) depot maintenance and vendors—the final source of supply for replacement items. Figure 7 shows the measurements associated with response time effectiveness.





The second diagnostic metric is the count of outstanding backorders associated with an NMCS condition. These NMCS backorders, which indicate a weapon system is inoperable, accumulate at

the wholesale source of supply because the required materiel is not available at either the retail or the wholesale level of supply. Figure 8 shows the measurements associated with NMCS backorders.



Figure 8. Not Mission Capable Supply Backorders

Growth in the backorder counts above can be an indication of future readiness problems. As the number of backorders greater than 30 days increases, the probability increases that NMC rates will rise.

Using Metrics to Track Inventory Management Improvements

The DoD inventory stratification process applies on-hand and due-in assets to authorized inventory requirements and approved economic and contingency levels. Assets that are excess to those requirements and levels are identified as PRS. A Department goal is to minimize excess inventories to the maximum extent possible.

The DoD Supply Chain Community reviews how inventory requirements and assets change over time. Metrics are collected to monitor increases and decreases in inventory. Both procurement receipts and customer returns are collected since increases to inventory, and sales and disposals, can be captured as decreases to inventory. Figure 9 illustrates how the collective result provides a complete picture of how inventories are changing.





Supply Chain Metrics Guide

To track the success of the Department's efforts to reduce excess inventory, two metrics are used. The first metric, excess on-hand (shown in Figure 10), is the dollar value of PRS and its percentage of the total inventory value that it represents.



Figure 10. Government Managed Excess On-Hand

The second metric, due-in potential future excess is the dollar value of DILS that stratifies to PRS. Long supply assets stratify above an individual item's authorized requirements (i.e., its AAO). Normally, procurements do not exceed the AAO; however, requirements for an item may decline after a contract is awarded, causing quantities on contract and on-hand to be greater than the AAO. Figure 11 breaks out on-contracts dollars that are within and above the AAO in different long supply categories. While on-order stock within the AAO meet a peacetime or wartime requirement, on-order stock above the AAO does not have a requirement and is subject to contract termination. However, only the PRS portion of DILS would be identified as excess on-hand if they are brought into the DoD supply chain. On the other hand, the ERS and CRS portions of DILS would have future demand in the long term or contingency usage that justifies their retention if they are brought into the DoD supply chain.

Using Metrics



Figure 11. Due-In Long Supply

Two additional metrics used to monitor excess focus on systemic drivers of excess inventory: forecast error (divided into forecast accuracy and forecast bias) and procurement lead-time variance. Forecast accuracy and forecast bias measure the ability of materiel managers to predict future customer demand. If forecasts are higher than actual demand, then the requirements levels based on those forecasts will be too high and, in time, will result in excess inventory. If forecasts are lower than actual demand, then inventory levels may not be enough to meet demand and the result would be backorders.

Forecast accuracy measures that difference between an item's forecast and its actual demand. If the difference is positive—a positive bias—then the item is over-forecasted; a forecast of 100 with actual demand of 80 would be an example of over-forecasted demand. If the difference is negative—a negative bias—then the item is under-forecasted; a forecast of 80 with actual demand of 100 would be an example of under-forecasted demand. While both examples would have an accuracy of 80%, the first example would have a positive bias of 20% and the second example would have negative bias of -20%. Figure 12 and Figure 13 illustrate how these two metrics look when item forecasts and demand are aggregated to a Component and DoD level.



Forecast Accuracy



Figure 13. Forecast Bias

Forecast Bias


Although 100% accuracy and 0% bias would be ideal, they are not realistic with the Department as demand volatility will always cause accuracy to be less than ideal and bias to be positive or negative over time. Currently, the Department is working to determine what values are possible for accuracy and bias given the volatility that materiel managers must deal with when forecasting demand.

Procurement lead time variance is the difference between the procurement lead time (PLT) and administrative lead time (ALT) used in resupply planning and the actual ALT and PLT for procurement actions. If planning lead times are greater than the actual lead times, procured materiel will be received into the supply system before it is needed. This results in long supply and, in some cases, excess inventory. If planning lead times are less than the actual times, procured materiel will not be received into the supply system when it is needed. This results in backorders. Figure 14 illustrates the overstatement and understatement of procurement lead times.

Figure 14. Procurement Lead Time Variances



DoD Lead Time Variance

Using Metrics to Monitor Distribution Effectiveness

The effectiveness of distribution within the DoD supply chain can be gauged by the time and cost to deliver materiel to customers. To provide lower costs for delivery with the same or better timeframes, materiel managers must have full visibility and access to assets across the supply chain (see Figure 15), as well as the ability to position assets where they are needed.





Delivery time and number of backordered deliveries focus attention on declining performance of the DoD distribution system. Transportation costs and the value of stored inventory monitor the cost of the DoD distribution system.

To track progress in improving distribution effectiveness, logistics response times (LRT) are collected and reviewed over time.

For example, Figure 16 shows LRT for DLA-managed repair parts that support weapon system maintenance. DLA manages those parts for all of the military services. The same LRT metric is used separately for Army, Navy, Air Force, and Marine Corps customers to track progress and focus attention on declining performance.



Two effectiveness metrics are used to measure performance with regard to wholesale stock positioning: gross depot effectiveness and net depot effectiveness. These metrics allow military services to determine if orders are being shipped out of distribution depots to customers.

Gross depot effectiveness measures the percentage of shipments to customers outside the continental United States (OCONUS) that are distributed from any distribution depot. Gross depot effectiveness (see Figure 17) is used to evaluate shipments of DLA-managed items.



Figure 17. Gross Effectiveness across the Services (OCONUS)

Net depot effectiveness measures the percentage of shipments made to customers mapped to a specific depot that is planning to stock the item. Separate charts are generated for shipments of DLA-managed items both within and outside the continental United States (CONUS and OCONUS). Under DLA's economic stock keeping unit (SKU) build (ESB), DLA is consolidating depot locations for slower moving items, with the goal of eliminating the high cost of depot level demand-based rebalancing or redistribution within CONUS. DLA is accomplishing this through attrition rather than bulk movement of stock between depots. Figure 18 shows the attrition version of the CONUS net depot effectiveness, which removes the effect of the ESB project until attrition is complete. ESB does not affect OCONUS shipments.





An increase in gross or net effectiveness percentages indicates that wholesale stock positioning is improving.

Using Metrics to Track the Impact of Improved Asset Visibility and Accessibility

System-wide visibility allows materiel managers to access and apply excess assets to requirements at retail sites to fill worldwide needs (see Figure 19). The assets can be used to offset procurements needed to sustain wholesale inventory levels or to fulfill demands the manager had to backorder because of a lack of stock.





Figure 20 shows the 2-part DoD-wide inventory accessibility metric. The first part of the metric—represented by the pie on the left—gives the percent of total inventory that is targeted for accessibility. The mission requirements of select deployed units require that their inventories not be targeted for accessibility. The second part of metric—represented by the pie on the right—shows the percent of targeted inventory that is accessible.



Figure 20. DoD-wide Inventory Accessibility

Inventory accessibility has both economic and performance benefits for the DoD supply chain. A performance benefit is that, through lateral redistribution, excess stock at some retail supply activities can be used to fill otherwise backordered demands placed by other retail activities. An economic benefit is that excess stock at retail supply activities can be used to offset the amount of stock that needs to be procured (and bought into the supply system) when wholesale stock levels are low. DLA tracks benefits (in dollars) from both lateral redistribution and procurement offsets, as shown in Figure 21.





As the military units train and deploy around the world, the demand for secondary items is changing—in quantities needed and specific customer locations. This continuously transforming customer environment requires better visibility and accessibility, as well as a superior level of performance from DoD wholesale materiel managers.

Supply availability and backorder metrics (shown in Figure 22) are used to evaluate the performance of DLA materiel managers.





Using Metrics to Explore and Explain a Performance Problem: An Example

To illustrate how the supply chain enterprise and functional metrics can be used to assess performance, the following example provides a case where a performance goal is not being met. In this case, the performance goal in question is the annual CWT that a military service has for its customers—15 days for delivery of service-managed items to its organizational maintenance customers.

During a mid-year review of its year-to-date CWT, performance was reported as 16 days. An analyst was tasked to identify what problems were causing the service not to meet its goal, what was being done to resolve those problems, and what additional actions needed to be taken.

First, the analyst reviewed the monthly year-to-date performance for CWT from the start of the year. Figure 23 shows that performance. He observed that in October, performance was four days above where it should have been but was approaching goal as the year progressed. Further analysis was required.





To conduct the additional analysis, the analyst decided to look at what was happening before October and use the diagnostic metric for CWT—response time effectiveness. Response time effectiveness breaks down CWT into three parts: (1) the CWT for orders filled by the retail echelon of supply, (2) CWT for orders filled by the wholesale echelon of supply, and (3) CWT for orders backordered at the wholesale echelon and filled by either a depot level repair or a purchase from a commercial supplier. By using the response time effectiveness metric, the analyst sought to gain insight into why performance was so far above goal in October and then slowly declined towards the goal for the next five months.

Figure 24 is the response time effectiveness metric for the CWT measurements in Figure 23 and the six months prior to October. The analyst found that between April and June, the supply chain was meeting the goal of 15 days as the average monthly CWTs ranged between 13 days and 14 days. Approximately 40% of customer demands were being filled with inventory on retail shelves while another 50% were being filled with inventory on wholesale shelves. The remainder of the demand was for reparable items that were mostly filled from depot level repair.

That changed in July as the average monthly CWT climbed from 13 days in June to a high of 20 days in October. The analyst highlighted the significant changes in Figure 24.



Figure 24. Drilling Down with a Diagnostic Metric

With this information in hand, the analyst conducted research with the various service operations, supply chain and maintenance personnel to diagnose the changes and identified the following:

- First, the analyst learned from service operations that the service engaged in new missions that resulted in customer orders for items not previously demanded.
- Then, service retail managers reported to the analyst that those items were not in retail stock at that time and had to be filled from the wholesale level of inventory. The result was a significant decline in retail fills and the corresponding increase in wholesale fills in July and August. Those changes resulted in the higher CWT as wholesale fill times were longer than retail fill times.

- To resolve this problem, the service retail managers began to order stock for their shelves in addition to ordering stock to fill their customer demands. The shelf-stock orders had a lower priority than the orders to fill the customer demands and consequently took longer to receive.
- Starting in September, retail supply activities began to receive stock for the newly demanded items. However, the stocking of retail shelves was a slow process that continued into the new fiscal year. By March, the new items were finally in place, and retail fills returned to normal levels. Because retail fill times on average have the fastest CWT, the overall CWT slowly declined from October to March.
- To investigate why the stocking of retail inventory took several months, the analyst talked to wholesale materiel managers. He learned that through October the unfilled retail demand caused the wholesale inventory to decline and the wholesale fill times to increase.
- To address this, the wholesale materiel managers initiated new procurements to satisfy the unfilled retail demand and to augment the wholesale inventory levels in order to meet supply availability goals. This further negatively impacted CWT because procurement times are much longer than retail fill times, wholesale fill times, and supplier repair times.
- After October, the analyst noted that the wholesale level of inventory began to recover as the augmented inventory levels resulted in fewer demands being filled by new procurements. In March, repair, not procurement, was once again the principal source for supplier fills for reparable items. The shorter repair time resulted in a return to the previous supplier-fill-time norm experienced between April and June.
- In short, the analyst found that between October and March, both retail and wholesale fill rates returned to normal and supplier times once again dropped to their normal levels as there was less reliance on procurement as a source of fill.
- While the fill rates returned to normal levels, the analyst was concerned that the resulting drop in average CWT for March to 12 days and the year-to-date CWT to 16 days may have created another issue. Specifically, the concern was that the actions taken to deal with the mission change may have overcompensated and created the potential for excess inventory at the wholesale level. Consequently, the analyst recommended to the wholesale managers that their forecasts for the augmented items be adjusted downward. Specifically, the surge in retail demand, which was from retail inventory shortages, should be subtracted from future demand forecasts. That surge was a one-time event that should not reoccur with the new retail levels. Including it in the forecasts would only inflate wholesale levels beyond what was required.

This example demonstrates how an analyst was able to use supply chain metrics to explore and diagnose a performance problem. He initially reviewed the performance over time for a metric that was not meeting its goal. He then was able to drill down into that poor performance with a related diagnostic metric to identify the sources of the problem. Working with personnel familiar with customer operations and supply chain stakeholders, he was able to explain what happened to cause the problem and how the supply chain reacted to it. Finally, he was able to identify a potential future problem from the actions taken and recommend a solution to avoid it.



Enterprise Level Metrics

The suite of standardized enterprise metrics described within this section were developed to monitor performance across supply chain functions and hierarchies. By evaluating both the effectiveness of the supply chain and the cost effectiveness of resource planning, leadership is provided with the necessary tools to assess the health of the DoD supply chain.

As described in the Introduction, this Guide links each metric to one of the following desired attributes for DoD supply chain management: materiel readiness, reliability, responsiveness, cost, and planning and precision. The attributes are defined in Appendix D.

This section contains detailed information on the suite of established enterprise level metrics, separated by supply chain attribute. That information includes e comprehensive description of each metric and instructions onhow the metric is measured and how it should be used. Charts showing measurements over time are included to help interpret the performance of each metric.

Due to the scope and complexity of the DoD supply chain, a comprehensive assessment of its performance requires a review of all of the enterprise metrics in this Guide and their interrelationships. In some cases, performance cannot be determined by looking at the metric itself; it must be assessed in concert with the performance of other related metrics. In such cases, the related metrics are provided for review in conjunction with the targeted metric.

Monitoring the suite of enterprise level metrics is also important to the Department's efforts to improve the DoD supply chain. Maximizing the performance in one metric could have a negative effect on another equally important metric. For example, minimizing supply chain costs without a process improvement may degrade customer materiel support. Therefore, no metric should be viewed in isolation.

Materiel Readiness Metrics

Description

Definition of Materiel Readiness as a DoD Supply Chain Attribute

The ability of the supply chain to support weapon systems in undertaking and sustaining their assigned missions at planned peacetime and wartime utilization rates.

Assessment Objective for Attribute

Determine if the mission capabilities of weapon systems have been degraded because of a decline in supply chain support.

Materiel Readiness Metrics

Outcome Metric:	Not Mission Capable (NMC) Rates Portrays how well the supply chain supports the materiel needs of weapon systems or groups of weapon systems.
Diagnostic Metric:	Not Mission Capable Supply (NMCS) Backorders Two factors have a negative impact on NMC rates: (1) the number of wholesale NMCS backorders and (2) the age of the backorder.

Not Mission Capable (NMC) Rates

Use of the NMC Rates

Measured at the weapon system level, this metric reflects the results (the outcome) of DoD supply chain execution and serves as an independent indicator of how well the supply chain is meeting the needs of the warfighter. It is also used as a risk indicator to evaluate the effect of changes in supply chain processes to improve support to the warfighter.

While NMC rates assess overall weapon system readiness, the NMCS rate is directly tied to supply chain performance. The NMCS rate reflects the delay in obtaining replacements for failed items that are preventing a weapon system from performing its mission. Although such a delay is also associated with CWT for organizational maintenance (CWT_{OM}), the measured wait time is not directly related to NMCS rates because that relationship can be masked by workarounds, such as cannibalization (i.e., using parts extracted from other inoperable weapon systems).

The notional graphs in Figure 25 illustrate the general conclusions that can be made from plotting the NMC rates over time. Increasing rates are negative, in that they show degradation of readiness. Decreasing rates are positive in that they show improving readiness. One-time spikes or jumps in rates are negative anomalies; the cause of such anomalies should be researched.

Enterprise Metrics

Figure 25. Assessments from NMC Rate Graphs



Development of NMC Rates

Supported Supply Chain Strategic Objective	Sustain weapon system materiel readiness.
Attribute	Materiel readiness: This metric quantifies the effect of the supply chain materiel support on the readiness of weapon systems or groups of weapon systems (for purposes of this metric, C3 and C4 casualty reports [C3/C4 CASREPs] are an NMC condition for Navy ships, submarines, and shipboard systems).
External or Internal	External: Collected by the military services and reported as part of the data collection process from the Under Secretary of Defense for Personnel and Readiness.

Description of NMC Rates

Definition	The percentage of time that a materiel condition exists, indicating that systems and equipment are not capable of performing any of their assigned missions because of maintenance requirements (NMCM) or a maintenance work stoppage due to a supply shortage (NMCS).
	(Definition taken from DoD Instruction (DoDI) 3110.05, <i>Readiness-Based</i> <i>Materiel Condition Reporting for Mission-Essential Systems and Equipment</i> , and Joint Publication 1-02, DoD Dictionary of Military and Associated Terms.)

Pusinoss Valuo	Although not an internal supply chain performance measurement, this metric serves as the principal measurement for assessing the outcome of the support provided to the warfighter by the DoD supply chain. The breakout of		
Business value	this metric into NMCS and NMCM rates allows materiel managers to relate weapon system readiness problems to either supply support or maintenance support.		
	Goals		
	• Army		
	capable (MC), 10% NMCS, 10% NMCM, and 5% partially mission capable (PMC)		
	\circ Ground and missile equipment—90% FMC, 10% NMC		
	• Navy		
Goals and Trend	\circ Deployed aircraft—61% FMC and 78% MC		
Analysis	\circ Non-deployed aircraft 58% FMC and 73% MC		
	• All aircraft 10% NMCS		
	 Deployed ships 25% of time with C3/C4 CASREPs New deployed ships 20% of time with C3/C4 CASREPs 		
	• Air Forge varies by circreft		
	All Force—varies by ancrait Maring Corner 100/ NMC gool		
	• Marine Corps: 10% NMC goar		
	negative.		
Computation	The military services compute rates in accordance with the Defense Readiness Reporting System, DoDI 3110.05.		
	Frequency: Quarterly submission by the military services.		
OSD Data Requirements	Content: MC rates for aggregate weapon system groups and key weapon systems listed in the Quarterly Readiness Report to Congress. Besides NMCM and NMCS rates, submissions should include applicable FMC rates, PMC rates, and MC rates. For Navy ships, equivalent rates are the percentage of time with C3/C4 CASREPs.		
General Display	NMC rates by military service weapon system groupings, with additional displays by service, weapon group, and weapon system showing NMCS and NMCM rates as well as applicable FMC, MC, and PMC rates. Figure 26 shows		
	the general display for NMC rates by military weapon system.		

Figure 26. General Display for Not Mission Capable Rates



Service Not Mission Capable Rates

Relationship of NMC Rates to Other Metrics

The metrics presented below address only the supply contributors to NMCS rates.

Key Relationships



Not Mission Capable Supply (NMCS) Backorders

Use of the NMCS Backorders

If a materiel order that is causing an NMCS condition is not filled by the DoD supply chain, it becomes an NMCS backorder at the wholesale level. An increasing number of NMCS backorders indicates that customer service to the warfighter is declining.

The notional graphs in Figure 27 illustrate the general conclusions that can be made from plotting NMCS backorders over time. The metric reports the number of NMCS backorders 1–30 days old (illustrated with light blue in Figure 27) and those more than 30 days sold (illustrated with dark blue in Figure 27). NMCS backorders older than 30 days indicate more serious NMCS problems.



Figure 27. Assessments from NMCS Backorder Graphs

Development of NMCS Backorders

Supported Supply Chain Strategic Objective	Sustain weapon system materiel readiness.
Attribute	Materiel readiness: An NMCS backorder indicates a weapon system cannot perform its mission until a replacement part is provided to maintenance.
External or Internal	Internal: This metric is collected within the DoD supply chain at the wholesale echelon of supply.

Description of NMCS Backorders

Definition	The number of wholesale backorders that are associated with an NMCS condition (grouped for recognition of those backorders) up to 30 days old and those older than 30 days.
Business Value	Because NMCS backorders constitute the longest delays associated with NMC rates, this metric serves as a principal measurement of the supply chain's effect on service to the warfighter. (The additional time to fill a NMCS backorder may be short, but the associated request from the maintainer will endure some of the longest CWTs.)
Goals and Trend Analysis	Goals: The DoD components do not have goals for this metric; they track changes in counts and age.Trend: A downward trend in NMCS backorders is positive; an upward trend is negative.
Computation	 The following backordered requisitions are counted by their time on backorder: A "999", "E_", or "N_" in a requisition's required delivery date indicates a NMCS condition. (See Volume 2 of Defense Logistics Manual [DLM] 4000.25-M) A "W" in the first digit of the serial number of a requisition document number indicates a C2/C3/C4 CASREP condition. (See Naval Supply Systems Command Publication 485). To separate C2 CASREPs from C3/C4 CASREPs, the Navy relies on a separate CASREP file.
OSD Data Requirements	Frequency: Monthly submission by the military services and DLA. Content: On-hand backorders for requisitions that are coded to reflect a NMCS or ship CASREP condition divided between backorders that are 0–30 days old and those >30 days old.
General Display	NMCS backorders counts by age. Figure 28 shows the general display for NMCS backorders counts by age.



DLA Total NMCS/MICAP/CASREP Backorders

Figure 28. General Display for Not Mission Capable Supply Backorders

Relationships NMCS Backorders to with Other Metrics

Key Relationships:

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Response Time Effectiveness		NMCS Backorders	
			Procurement Lead Time Variance

Response Time Effectiveness	Response time effectiveness measures the times and percentages of weapon system materiel orders filled within each echelon of the DoD supply chain and the percentage filled by a commercial supplier. NMCS backorders are related; they represent the number of outstanding orders being filled by supply chain suppliers, either through a scheduled replenishment order or an unplanned direct vendor delivery (DVD). As NMCS backorders trend upward, the percentage of orders filled within the DoD supply chain should go down, and vice versa.
Wholesale Supply Availability	Wholesale supply availability measures the effectiveness of the wholesale echelon in filling all requisitions, including NMCS requisitions. As wholesale supply availability increases, the number of NMCS backorders should decrease. (See wholesale supply availability for other metrics that affect it and, in turn, affect the number of NMCS backorders.)
Procurement lead time variance	Procurement lead time variance quantifies the suppliers' ability to deliver to the DoD supply chain as predicted. If the variance indicates a high degree of late deliveries, this could cause NMCS backorders to increase. If the variance indicates a high degree of early deliveries, this could cause NMCS backorders to decrease.

Responsiveness Metrics

Description

Definition of Responsiveness as a DoD Supply Chain Attribute

The ability of the supply chain to respond to customer materiel requests according to their priority by providing the right support when and where it is needed.

Assessment Objective for Attribute

Determine if the supply chain is supporting readiness and satisfying its customers in a timely manner.

Responsiveness Metrics

Outcome Metric:	Customer Wait Time for Organizational Maintenance (CWT _{OM}) Quantifies the responsiveness of the DoD supply chain to orders placed by weapon system maintainers. It is the customer-facing metric of the DoD supply chain.
Diagnostic Metrics:	Logistics Response Time (LRT) If LRT is increasing or is extended beyond time definite delivery (TDD) standards because of stock shortages, distance to customer, transportation mode, etc., the delay in filling requisitions can affect the CWT or service associated with unavailability of materiel at the retail activities that submit those requisitions.
	Response Time Effectiveness If an increasing percentage of orders are not filled at the retail echelon of supply, the longer response times can affect the CWT or service associated with those orders. This metric consists of both times and percentages for fills by the retail echelon, by the wholesale echelon, and by DoD supply chain suppliers.

Customer Wait Time for Organizational Maintenance (CWT_{OM})

Use of the CWT_{OM}

This metric evaluates the time required to provide materiel in response to orders from maintainers directly supporting weapon systems (that is, organizational maintenance or field maintenance, where intermediate maintenance does not exist). The weapon systems may be involved in training and contingency operations.

This metric represents the last customer-facing metric in the DoD supply chain. As such, its transaction time is how the end-use customer judges the responsiveness of the DoD supply chain.

The Army, Navy, and Air Force have CWT_{0M} goals (listed below); the Marine Corps' goal is in development. Times that are at or below these goals meet targeted performance, while times above the goals do not.

The notional graphs in Figure 29 illustrate the general conclusions that can be made from plotting CWT over time. Increasing times are negative, in that they show greater delays in providing needed materiel. Decreasing times are positive, in that they show a reduction in delays. A one-time spike or jumps in CWT_{OM} are negative anomalies that are researched to identify a cause.



*Figure 29. Assessments from CWT*_{OM} *Graphs*

Development of CWT_{OM}

Supported Supply Chain Strategic Objective	Sustain weapon system materiel readiness.
Attribute	Responsiveness: Although this metric directly measures support to weapon system materiel readiness, it is associated with supply chain responsiveness. Timely receipt of replacement parts by organizational maintenance is critical to reducing the time to replace failed parts that are causing an NMC condition for a weapon systems. CWT _{OM} quantifies the time to receive those replacement parts. As such, it represents the outcome of the supply chain in supporting the maintenance actions that directly affect the readiness of weapon systems or groups of weapon systems.
External or Internal	Internal: Each military service collects the data it needs to report on this metric.

Description of CWT_{OM}

Definition	The total elapsed time between the submission of a customer order from organizational maintenance and the receipt of that order by organizational maintenance.
Business Value	 By showing the outcome to the customer, this metric indicates how responsive the DoD supply chain is from an end user's perspective, and links supply chain performance to the operational availability of weapon systems as the mean logistics delay time (MLDT) factor.
Goals and Trend Analysis	Goals: Performance goals are set by the military services. Trend: A downward trend in CWT is positive; an upward trend is negative.
Computation	This metric is computed as the average CWT_{0M} for a month, but it excludes the 1% of observations that represent the longest times. Those times are normally attributable to data errors or extraordinary circumstances and, therefore, are not representative of normal supply chain responsiveness. Besides the average monthly CWT_{0M} , the military services compute the year-to-date CWT_{0M} for their customers and measure it against their fiscal year goals. The monthly 1% exclusion rule also applies to this metric. After applying the 1% rule to the total aggregate population of their customer requests, a military services may also apply filters to either (1) focus on the items it manages and/or urgency customer demands or (2) exclude observations outside of the 1% rule that are known to be non- representative of the service's process generating CWT_{0M} (e.g., demands worked manually by a supply activity that temporarily lost its materiel management system).
OSD Data Requirements	 (1) Frequency: Monthly Content: Individual records for each order placed by a weapon system's field-level maintainers. (2) Frequency: Quarterly Content: For the military services with annual performance goals, their year-to-date performance against their goal.
General Display	By military service; the year-to-date performance against goals as well as the monthly performance for all sources of supply, and separately for DLA and the military services. Figure 30 shows the general display for CWT_{OM} .

Figure 30 General Display for Customer Wait Time for Organizational Maintenance



Relationships of CWT_{OM} to Other Metrics



NMC Rates	The responsiveness of the supply chain to fill orders for materiel to sustain the readiness of weapon systems is measured by the average CWT that organizational maintenance experiences when ordering replacement components. If wait time increases, NMC rates will increase, unless workarounds, like cannibalization (disassembly of parts from inoperable systems for use in the repair of other weapon systems), are used.
Logistics Response Time	Measures the speed of the wholesale echelon in delivering requisitioned materiel, including materiel going directly to weapon system maintainers when unavailable in forward stockage points. Reducing the LRT will put materiel on retail shelves faster and provide faster delivery of materiel going directly to maintainers (i.e., lower CWT).

Response Time Effectiveness	 Measures the percentage filled at each supply echelon or level, and how long it takes to fill those orders at each level. If the percentage of orders filled at the retail echelon is increasing, then CWT should be decreasing.
	• If the percentage of orders filled at the wholesale echelon is increasing while the percentage of orders filled at the retail echelon is decreasing, then CWT should be increasing.
	• If the percentage of orders filled by supply chain suppliers is increasing, then CWT should be increasing.

Logistics Response Time (LRT)

Use of the Logistics Response Time

This metric quantifies the time requisitioners wait to receive the materiel they order. It is the wholesale order fulfillment time for customer orders not filled at the retail level. It is also the transaction time for requisitions replenishing retail inventory levels (called the order and shipping time).

LRT includes backorder time, which is not included in the TDD compliance metric. LRT also includes all orders placed on the wholesale echelon of supply, with the exception of initial outfitting orders.

The notional graphs in Figure 31 illustrate the general conclusions that can be made from plotting LRT over time. Increasing times are negative, in that they show greater delays when providing requisitioned materiel. Decreasing times are positive, in that they show a reduction in delays. A one-time spike or jumps in times is a negative anomaly that are researched to identify a cause.



Figure 31. Assessments from LRT Graphs

Development of Logistics Response Time

Supported Supply Chain Strategic Objective	Sustain weapon system materiel readiness.
Attribute	Responsiveness: Although this metric includes CWT _{OM} measurements for weapon system end-use orders filled at the wholesale echelon of supply, it is associated with supply chain responsiveness. Timely receipt of materiel demanded from wholesale sources of supply by retail activities and end-users reduces backorders and backorder times at those retail activities.
External or Internal	Internal: Based on transaction data collected from the Logistics Metrics Analysis Reporting System (LMARS), this metric quantifies the speed at which requisitions placed on wholesale materiel managers pass through the order and delivery process.

Description of Logistics Response Time

Definition	A measurement of the mean elapsed time between generation of a requisition (i.e., requisition serial date) and receipt of materiel (i.e., date receipt posted to stock record or property account or equivalent). Initial outfitting orders are excluded from this metric.
Business Value	Indicates how timely the wholesale echelons of supply and distribution systems are in responding to their customers—the largest segment being retail activities. Represents the results of DoD supply chain efforts to deliver materiel to retail activities in accordance with the Department's negotiated TDD standards.
Goals and Trend Analysis	Goals: LRT measurements include backorder time. If backorder time is removed, TDD standards can be used as goals for LRT. Trend: LRT is a function of the geographical location of the customer and the transportation used to ship materiel to the customer. Within a location and mode combination, a downward trend in LRT is positive; an upward trend is negative.
Computation	The measurement of LRT is from the date the requisition is generated and passed to the designated source of supply until the date the requisitioned materiel is received and posted in the requisitioner's materiel management system. The LRT metric is the average time associated with completed orders in a month. (Initial outfitting orders are excluded from this metric.)
OSD Data Requirements	Frequency: Monthly from DLA Transaction Services Content: Individual LMARS records for each requisition placed on wholesale sources of supply.
General Display	Total pipeline times, which are equivalent to the average LRT for a month, and individual pipeline segment times, which are monthly averages, by source of supply, combatant command (COCOM), and priority group. Figure 32 shows the general display of LRT by source of supply.





Relationships of Logistics Response Time to Other Metrics

Key Relationships:



Wholesale Supply Availability	Measures the effectiveness of the wholesale echelon in filling all requisitions. As wholesale supply availability increases, LRT should decrease because more requisitions are filled immediately with off-the- shelf stocks (i.e., fewer backorders and less backorder time)
Perfect Order Fulfillment	Measures the reliability of the DoD supply chain with regard to requisitions on the wholesale echelon. Besides looking at the right quantity, right condition, and right quality, it considers right time by determining if the requisition's LRT meets the appropriate TDD standard.
Customer Wait Time OM	Measures the overall speed of the DoD supply chain in responding to orders associated with weapon system maintenance and includes LRT for end-use requisitions. It also depends on the timely fulfillment of resupply requisitions as measured by LRT.
TDD Compliance	Determines if the times for requisitions being fulfilled through the DoD supply chain are meeting TDD standards. Those times are the requisitions' LRT less any time the requisitioned materiel may be on backorder. Therefore, the times used to determine TDD compliance differ from LRT when requisitions are backordered.

Response Time Effectiveness

Use of the Response Time Effectiveness

Although the definition and business rules associated with this metric have been established, the procedures for data submission of the data needed to compute the metric are still evolving.

As for the metric itself, response time effectiveness quantifies the average time and the percentage of time a demand from organizational maintenance is filled at the retail level, at the wholesale level, or by a DoD supply chain supplier. As such, it evaluates the expected outcomes associated with the range and depth of inventories held by the DoD supply chain at the retail and wholesale levels.

Because the response time increases as orders are passed from the retail level to the wholesale level and to commercial suppliers, it also provides an indication of how overall response times might change because of changes in stockage policy and where demands are being filled.

The notional graphs in Figure 33 illustrate the general conclusions that can be made from plotting response time effectiveness over time. The areas and lines on the left chart are relatively stable, indicating the supply chain is performing within historical norms to the demand from weapon system maintainers. The chart on the right has an anomaly in month 3, when the retail and wholesale fill percentages drop.





The two charts in Figure 34 show the effect of decreasing and increasing wholesale fill times (LRT for orders that are not backordered or an unplanned DVD). Because the average CWT is affected by the three sources of fill, the effect on CWT of a trend in one may be offset by what is happening in the other two.



Figure 34. More Assessments from Response Time Effectiveness Graphs

Development of Response Time Effectiveness

Supported Supply Chain Strategic Objective	Sustain weapon system materiel readiness.
Attribute	Responsiveness: Although this metric breaks down CWT _{OM} measurements supporting weapon system materiel readiness, it is associated with supply chain responsiveness. It identifies which customer orders are being filled within the retail or wholesale echelons of the DoD supply chain or by supply chain suppliers.
	As such, it measures the effectiveness of rules for when to stock and how much to stock. Ineffective rules will result in slow supply chain responsiveness.
External or Internal	Internal: A combination of different metrics collected by the military services and DLA; it is designed to measure the overall effectiveness of the DoD supply chain in responding to customer orders.

Description of Response Time Effectiveness

Definition	The CWT and percentage of all orders falling within pre-designated buckets. Represents fills by immediate local retail issue, fills by other issues within the supply chain, and fills by supply chain suppliers outside of DoD.
Business Value	Tracks the overall effectiveness of the DoD supply chain in responding to organizational maintenance orders for weapon system items.
Goals and Trend Analysis	Goals: No goal exists for this metric. Trend: A downward trend in the percentage of external supplier issues is positive; an upward trend is negative.

Computation	The computation by the military services is based on the related metrics each service collects. (See the note below for the military services' computations of this metric.)
OSD Data Requirements	Frequency: Monthly Content: To be determined
General Display	When data collection is complete, the metric will be displayed by military service and will show the average time and the percentage of time a demand from organizational maintenance is filled at the retail level, at the wholesale level, or by a DoD supply chain supplier. Figure 35 shows the general display for response time effectiveness.

Figure 35. General Display for Response Time Effectiveness



Response Time Effectiveness

Relationships with Other Metrics

Key Relationships:

Customer Wait Time OM	1 → Response Time Effectiveness → NMCS Backorders
Customer Wait Time OM	The number of orders that go into CWT is the basis for computing response time effectiveness. In addition, the number of retail issues that go into the computation may be based on orders with a CWT less than or equal to a given time parameter.
NMCS Backorders	NMCS backorders are orders that aren't filled within the DoD supply system and must be filled by supply chain suppliers. NMCS backorders should have zero retail fills; wholesale fills, vendor fills, and times to fill, depend on if they are filled by depot maintenance or a wholesale procurement.

Note on Computation by Military Service

- Army To compile times and percentages for retail fills, wholesale fills, or supply chain supplier fills (i.e., wholesale backorders), the Army provides data that indicates how orders are filled (i.e., source of fill). Lateral fills (either on or off base), local purchases, local manufacturing, spare turn-ins, and local supply activity fills are all considered retail fills.
- **Navy** The Navy metric uses the following measures to compute both aviation and maritime response time effectiveness:
 - Navy first-pass effectiveness retail measurements for retail fill percentages
 - Navy CWT data for
 - o onboard issue times for maritime retail fill times and
 - o 2 days or less times for aviation retail fill times
 - Navy first-pass effectiveness wholesale measurements for wholesale fill percentages for Navy-managed items
 - DLA Navy NMCS supply availability for wholesale fill percentages for all non-Navy-managed items
 - For wholesale fill times, Navy and DLA LRTs for immediate issues and planned DVDs for Navy customers, where separate times are collected for DLA maritime and aviation supply chains
 - For supplier fill times, Navy and DLA LRTs for backordered and unplanned DVDs for Navy customers, where separate times are collected for DLA maritime and aviation supply chains.
- **Air Force** To compile times and percentages for retail fills, wholesale fills, or supply chain supplier fills (i.e., wholesale backorders), the Air Force computation uses the following CWT data elements to categorize each record into one of the three groups:
 - If the requisition number is blank, the order filled by the base.
 - For orders not filled at a base, the routing identifier codes (RICs), the RICs in the fill (the item's source of supply), and the routing identifier (RID) filling the requisition. If the source of supply and the RID are equal, it is not a retail fill; if they are different, it is a retail fill.
 - For fills that are not retail, the depot backorder code. If yes, it is a wholesale backorder and supplier fill; if no, it is a wholesale fill.

Marine
CorpsThe Marine Corps' fill percentages are based on Marine CWT data and inventory
control point (ICP) supply availabilities as follows:

- No requisition number in the CWT recorder indicates a retail fill.
- If the record's materiel receipt acknowledgement (MRA) RIC indicates a lateral fill, local purchase, local manufacturing, or a DLA Disposition Services issue, it is considered a retail fill.
- Wholesale and supplier fill percentages are computed as the respective sums of non-retail fill percentages for a source of supply divided by the supply availability for that source of supply.

The Marine Corps' times are based on CWT as follows:

- The average time to fill an order from the retail level is the CWT for retail fills.
- The average time for wholesale fills is compiled from the requisition-weighted LRTs for immediate issues and planned DVDs for sources of supply (DLA, General Services Administration, Army, etc.).
- The average time for supplier fills is compiled from the requisition-weighted LRTs for backordered and unplanned DVDs for sources of supply.

Reliability Metrics

Description

Definition of Reliability as a DoD Supply Chain Attribute

The dependability and consistency of the supply chain providers in the delivery of required materiel support at a time and destination specified by the customer.

Assessment Objective for Attribute

Determine if the supply chain responds to its customers' demands in a consistent manner and, in so doing, sustains or improves customer confidence in the supply chain and materiel support to weapon system readiness.

Attribute Metrics

Outcome Metric:	Time Definite Delivery (TDD) Compliance Quantifies the result of efforts of DoD supply chain providers to fill requisitions and deliver materiel in a timely manner.
Diagnostic Metrics:	Wholesale Perfect Order Fulfillment Deliveries that are not perfect adversely affect customer confidence in the supply chain's ability to deliver the right materiel at the right time with the right quantity, quality, and documentation. This metric is an extension of TDD compliance, which addresses other conditions of order fulfillment in addition to timeliness.
	Wholesale Supply Availability Although backorder time is excluded from TDD compliance, requisitions not filled immediately by the wholesale echelon affect the time retail supply activities must wait for requisitioned materiel. This metric quantifies the percentage of time a requisition is not backordered.
	Materiel Denial Rates If a materiel manager directs a distribution depot to release stock to fill a customer requisition and the response is a materiel denial, the subsequent delay in filling that order can affect the time a retail supply activity must wait for requisitioned materiel. This metric measures the percentage of time a release order is denied.

Time Definite Delivery (TDD) Compliance

Use of the TDD Compliance

This metric evaluates how well the DoD supply chain is meeting the delivery standards which were negotiated with DoD supply chain customers and providers. The standards address source, supplier, transporter, and theater segments of the supply chain (refer to Figure 37).

Standards vary by customer location and the priority the customer assigns to requisitions, but the goal is for the total time between initiation of an order and delivery of materiel to be within the standard 85% of the time (without considering backorder time).

The graphs in Figure 36 lead to general conclusions that can be made from plotting TDD compliance over time. The chart on the left shows performance against the goal, which in this case is slightly below goal. The chart on the right shows how the number of shipments included in the percentage of compliance is changing. The combination of both graphs provides a comprehensive picture of how shipments are being delivered against delivery standards.



Figure 36. Assessments from TDD Compliance Graphs



Development of TDD Compliance

Supported Supply Chain Strategic Objective	Accurately forecast customer materiel needs.
Attribute	Reliability: Quantifies the reliability of the DoD supply chain in meeting TDD standards for requisitions placed on the wholesale echelon of supply. The DoD TDD standards provide delivery performance targets by COCOM, region within COCOM, and transportation mode, as dictated by the customer's priority.
External or Internal	Internal: Collected by the U.S. Transportation Command (USTRANSCOM).

Description of TDD Compliance

Definition	Within a specified degree of probability, the logistics system is capable of delivering required materiel to the customer within a given period. As a metric, TDD compliance measures the count and percentage of shipments that meet the TDD standards for a given COCOM and transportation mode. For this metric, backorder time is excluded (see Figure 37).
Business Value	This metric quantifies the reliability of the DoD supply chain in meeting negotiated delivery times for responding to customer requisitions.
Goals and Trend Analysis	Goals : 85% of deliveries meet their TDD standard. Trend : A downward trend in TDD compliance is negative; an upward trend is positive.
Computation	Computed as the percentage of requisitions that meet their TDD standard over the total number of requisitions. USTRANSCOM sets rules on what requisitions are included in its computations—primarily (but not limited to) Class IX items.

Enterprise Metrics

OSD Data Requirements	Frequency : Monthly collection from the USTRANSCOM website. Content : The following Distribution Process Owner Joint Deployment and Distribution Enterprise Metric executive dashboards and associated LRT statistics:
	 The percentage of global, CONUS, and COCOM shipments that meet TDD standards The number of global, CONUS, and COCOM shipments.
General Display	Global, Army Central Command, and Marine Corps Forces Central Command dashboards, with additional statistical displays. Figure 37shows the general display of assessments from global TDD compliance.

Figure 37. Assessments from TDD Compliance Graphs



- Notes: (1) The data source for LRT data is the Logistics Metrics Analysis Reporting System (LMARS) maintained by DLATransaction Services.
 - (2) Requisitions that are routed through the Defense Automatic Addressing System (DAAS) are (a) end user customer demands not filled by retail supply and (b) orders to replenish retail stocks.
 - (3) An inventory control point (ICP) can be (a) organic for items stocked and managed by a DoD Component or (b) commercial for items stocked and managed by a vendor under a planned direct vendor delivery agreement where the requisition goes directly to the vendor or through a Component ICP to the vendor.

Relationship with Other Metrics

Key Relationship:

TDD Compliance	Logistics Response Time (Less Backorder Time)
Logistics Response Time	Measures the speed of the wholesale echelon in delivering requisitioned material. The version of LRT used for TDD compliance excludes the time

Logistics	Measures the speed of the wholesale echelon in derivering requisitioned
Response Time	materiel. The version of LRT used for TDD compliance excludes the time
[Less Backorder	that requisitions are on backorder. TDD compliance determines if speed of
rimej	those deliveries is fast enough to meet the negotiated delivery standards.

Figure 37 illustrates the relationship between TDD compliance, LRT, and LRT less backorder time (also referred to as LRT[-]).

Wholesale Perfect Order Fulfillment

Use of the Wholesale Perfect Order Fulfillment

This metric evaluates the performance of wholesale supply in satisfying customer demand on time with the right quantity, sufficient quality, and proper documentation. Within the military services, discrepancies involving quantity, quality, and documentation are handled on an individual transaction level and not aggregated. At the OSD level, this metric provides aggregate measures of those discrepancies.

The notional graph in Figure 38 illustrates that on-time delivery is, and has been, the major driver of perfect order fulfillment (POF). The difference between POF and on-time delivery are discrepancies in quantity, quality, and documentation (primarily quantity).



Figure 38. Information Shown on POF Graph

Development Wholesale Perfect Order Fulfillment

Supported Supply Chain Strategic Objective	Accurately forecast customer materiel needs.
Attribute	Reliability: Timely receipt of the correct quantity as ordered in the right condition with the proper documentation is a key indicator of reliable supply chain performance.
External or Internal	Internal: Transaction data collected from LMARS tracks the fulfillment of requisitions placed on the DoD wholesale echelon of supply. LMARS is the official DoD system for tracking and collecting data on requisitions from

Enterprise Metrics

their initial generation until the requisitioned material is received by the
requisitioner.

Description of Wholesale Perfect Order Fulfillment

Definition	The percentage of orders delivered on time with the correct quantity, in the right condition, and with proper documentation.
Business Value	Indicates, based on timeliness and quality criteria, how well the DoD wholesale supply, order management, and distribution systems are performing together to provide materiel to customers.
	The military services and DLA do not need to collect this metric because they (1) track timeliness and quality issues separately and (2) capture quality issues at the individual order level, not the aggregate level. Wholesale POF captures quality at the aggregate level.
	Goals: No goal for this DoD-wide metric.
Goals and Trend Analysis	Trend: A downward trend in wholesale POF is negative; an upward trend is positive.
Computation	Use TDD standards and LMARS materiel acknowledgement receipt discrepancy coding to determine if an order is perfect. See Note 1 on page 52 for the rules used to make that determination.
	Frequency: Monthly from DLA Transaction Services
OSD Data Requirements	Content: Individual LMARS records for each requisition placed on wholesale sources of supply, including any MRA discrepancy code for the requisition.
General Display	POF and its contributors—on-time fill percentage, right quantity percentage, sufficient quality percentage, and proper documentation percentage—are displayed over time. Separate displays are for all classes of supply and Class IX items.
	Currently, two other versions of POF are displayed. See Note 1 on page 52 for their description.
	Figure 39 shows the general display for POF.





DoD Perfect Order Fulfillment

Relationship to Other Metrics

Key Relationship:

Wholesale Perfect Order Fulfillment TDD Compliance	
TDD Compliance	Evaluates delivery time against on-time performance. Although POF is derived from on-time performance, right quantity, sufficient quality, and proper documentation, the driver for POF measurements is on-time performance.

Note 1: Rules for determining if an order is perfect

Perfect

An order is perfect if it is delivered on-time with the right quantity, in sufficient quality, and with proper documentation. A failure of any one of these four conditions is a POF failure for that order.

While meeting a time standard or a customer date is the basis for the on-time condition, the LMARS MRA discrepancy code on an order is the basis for the other conditions. Codes are not always complete or accurate, and the Department is developing systems to improve the reporting on several conditions. Once the new sources are developed fully and the issues relative to the complete codes are resolved, the designation of a perfect order should improve.

On-Time

A delivery is on time if its LRT (i.e., the total time to complete the order from initiation to delivery) is within the applicable TDD standard for that order. Standards are based on the region within the customer's COCOM area of responsibility and the priority the customer places on the order.

Right Quantity

A delivery has the correct quantity if its MRA discrepancy code is not "F".
"F" indicates a shortage or partial or total non-receipt.

Sufficient Quality

- A delivery has sufficient quality if its MRA discrepancy code is not "A", "D", "E", or "X".
- "A" indicates a supply discrepancy report is being submitted (excludes shortage and partial or total non-receipt).
- "D" indicates a transportation discrepancy report being submitted (excludes shortage and partial or total non-receipt).
- "E" indicates a product quality deficiency report is being submitted.
- "X" indicates a discrepant receipt, other than shortage and partial or total non-receipt, which does not meet qualifying criteria for discrepancy report submission.

Proper Documentation

A delivery has the proper documentation if its MRA discrepancy code is not "B". "B" indicates there is no record of requisition.

Wholesale Supply Availability

Use of the Wholesale Supply Availability

This metric evaluates the range and depth rules of DoD wholesale materiel managers; that is, ensuring they are stocking the right items in the right quantities.

If stock is not readily available to fill the quantity on a customer requisition, the requisition is backordered. A backorder, whether eventually filled by an incoming procurement, expedited repair, an unplanned DVD, or a lateral distribution action, reduces service to the customer by adding additional time to complete the fill action. If stock is on the shelf to fill the demand, then no time on backorder is added to the demand's LRT.

For an individual requisition, either sufficient stock is on the shelf to fill it or there is insufficient stock to fill all or part of the order quantity. However, because wholesale supply availability is an aggregate across all requisitions, it is a percentage between zero (all requisitions are backordered) and 100 (no requisitions are backordered).

The notional graph in Figure 40 illustrates the wholesale supply availability plot over time. It includes two counts—demands and backorders—that are used to compute the wholesale availability percentage. If backorders increase and demand remains constant or decreases, availability will decline. If backorders remain constant or decline and demand increases, availability will increase. If both demand and backorders increase or decline, the behavior of availability will depend on whether demand or backorders has the bigger change.



Wholesale Supply Availability

Figure 40. Information Shown on Wholesale Supply Availability Graph

Development of Wholesale Supply Availability

Supported Supply Chain Strategic Objective	Accurately forecast customer materiel needs.
Attribute	Reliability: Backordering a requisition can add significant time to the normal time it takes the DoD supply chain to satisfy a customer's requisition. Therefore, the percentage of time a requisition is not placed on backorder is a key measure of the supply system's reliability in fulfilling customer orders
External or Internal	Internal: This metric is compiled by wholesale materiel managers as a measure of how often they have the stock needed to immediately fill demands.

Description of Wholesale Supply Availability

Definition	The percentage of demands placed on the wholesale echelon of supply that are not backordered, excluding future material obligations. Supply availability is synonymous with supply materiel availability.
Business Value	Serves as an indicator of wholesale inventory management's ability to plan and execute in a synchronous manner. Reflects the ability of wholesale materiel managers to respond to changes in customer demand and funding.
Goals and Trend Analysis	Goals:

Enterprise Metrics

	 Army—85% overall and 90% for NMC orders for stock availability metric (similar to supply availability)
	• Navy—85%
	 The Air Force employs readiness-based sparing, which has its own objective aircraft availability goals
	Marine Corps—85%
	 DLA—varies by commodity and performance-based agreement
	Trend: An upward trend is positive; a downward trend is negative.
Computation	100% – the backorder rate (which is backordered demand ÷ total wholesale demand). (Although this computation can be made for all of the military services and DLA wholesale materiel managers, it is an OSD computation, because this metric is not computed by some of the military services.)
	Frequency: Monthly
	Content: Components submit the following demand and backorder data:
	The number of demands placed on a military service and DLA
OSD Data	 The number of demands placed on a military service and DLA that were backordered
Requirements	The number of on-hand backorders at the end of the month
	• The number of on-hand backorders at the end of the month that are 180 days or older.
	The identification of what is a backorder based on status code (i.e., BB, BC, BD, BP, BV, and BZ) is determined by the component. Definitions for applicable codes are given below.
General Display	Supply availability as a percentage, the number of total demands and the number of backordered demands. Figure 41 shows the general display for wholesale supply availability.

Figure 41. General Display for Wholesale Supply Availability



Backordered Total Demand Placed on DoD Source of Supply

Delationships with Other Matrice

Relationships with	i other metrics	
Key Relationships:	Procurement Lead Time Variance	
Wholesale Supply A	Availability Demand Forecast Accuracy and Bias	
	Value of Secondary Item Inventory	
Procurement Lead Time Variance	Quantifies if suppliers are delivering materiel to the DoD supply chain as predicted. If the variance indicates a high degree of late deliveries, this could cause backordered demands to increase. If the variance indicates a high degree of early deliveries, this could cause backordered demands to decrease. Repair is the primary source of replenishment for DLR items, while procurement is the source for replenishing condemnations and new requirements. Repair cycle time is the lead time for repair. In the same way that procurement lead time affects wholesale supply availability, variance in repair cycle time affects wholesale supply availability.	
Demand Forecast Accuracy and Bias	Quantifies the ability of the DoD supply chain to predict the needs of its customers. If the demand forecast accuracy and bias metrics show that the DoD supply chain is over-forecasting customer requirements, inventory requirements levels should cover a larger portion of customer demand than expected, thereby contributing to a higher wholesale supply availability than expected. If the demand forecast accuracy and bias metrics show the DoD supply chain is under-forecasting customer requirements, inventory requirements levels should cover a smaller portion of customer demand than expected, thereby contributing to a lower wholesale supply availability than expected.	
Value of Secondary	A demand is normally not backordered if there is stock available to be issued from inventory to fill the demand quantity. If materiel managers are holding more inventory to meet demand while the level of demand is not	

Definitions for Backorder Status Codes

Value of Secondary Item Inventory

Sub-Metrics

Demands

Backordered Demands

The following requisition transaction status codes are associated with backorders:

BB – Item is backordered against a due-in to stock.

remains stable.

demands

• BC – Item on original requisition containing this document number has been backordered.

The total number of demands that are backordered.

increasing, then there should be more inventory available to fill demand and avoid backorders. The same is true if demand decreases and inventory

Wholesale supply availability = (demands – backordered demands) ÷

The total number of demands placed on the wholesale echelon of supply.

- BD Requisition is delayed because of need to verify requirements relative to authorized application, item identification, or technical data.
- BP Requisition has been deferred per customer instructions.
- BV Item procured and on contract for direct shipment to consignee.
- BZ Requisition is being processed for direct delivery procurement.

BV and BZ status codes indicate the requisition will be filled by an unplanned DVD (versus an immediate issue from stock).

Materiel Denial Rates

Use of the Materiel Denial Rates

Materiel denial rates evaluate the accuracy of depot storage records for requisitioned materiel. If a wholesale materiel manager issues a materiel release order to a depot to pick, pack, and ship an order to fill a requisition, a materiel denial occurs when the depot cannot locate the stock⁵ needed to ship the full quantity on the materiel release order. Upon receiving a materiel denial, the wholesale manager may issue from an alternative depot or backorder the demand.

Because this metric is focused on requisitioned materiel, it will not capture inaccuracies in account records for items that are not requisitioned.

The notional graphs in Figure 42 illustrate the general conclusions that can be made from plotting materiel denial rates over time. An increase in the rate indicates that more warehouse denials are occurring, which is a degradation in performance.

⁵ This happens when the depot's accountable record for the ordered materiel is incorrect.





Positive Trend



Performing within Historical Norms



Development of Materiel Denial Rates

Supported Supply Chain Strategic Objective	Effectively and efficiently manage materiel.
Attribute	Reliability: Knowing the stock locations and quantities for items in storage is important for maintaining asset visibility and accountability. It is also essential for pulling stock from storage to fill customer orders, as materiel denials lead to backorders when stock cannot be located. Backorders resulting from materiel denials will add to the normal time to respond to a customer's requisitions and degrade the reliability of the supply system.
External or Internal	Internal: This metric is collected as part of the Inventory Control Effectiveness (ICE) report produced by DLA Distribution.

Description of Materiel Denial Rates

Definition	The percentage of line items intended for shipment that distribution depots did not ship either partially or at all. This metric is not collected for retail storage activities.
Business Value	Measures the reliability of asset accountability systems at defense distribution depots.
	Quantifies how accountability systems match physical assets (book to floor).
	Serves as an indicator of the accuracy of inventory storage location records and the impact of inaccuracy on issue of materiel to customers.

Enterprise Metrics

Goals and Trend Analysis	 Goals: Current goal is 0.7% (effective 4th quarter of FY2012; prior to FY2012 the goal was 1%). Trend: A downward trend in materiel denial rates is positive; an upward trend is negative.
Computation	In accordance with DLM 4000.25, Volume 2, the materiel denial rate is the number of shipments for which all or part of the quantity failed to be shipped, divided by the total number of shipments.
OSD Data Requirements	Frequency: Quarterly Content: Denial rates by issuing service and DLA, which are collected from ICE reports that DLA Distribution provides to SCI (report control symbol DD-AT&L [Q] 935).
General Display	Denial rate as a fraction of a percentage and number of denials by DoD Component Figure 43 shows the general display for material denial rate

Figure 43. General Display for Materiel Denial Rate



Inventory Denial Rates for Military Services/DLA

Relationships with Other Metrics

Key Relationships:

Wholesale Supply Availability	←			
		NMCS Backorders	<	Materiel Denial Rates
Logistics Response Time	}←──			

Wholesale Supply Availability	A materiel denial at a storage location could result in a backordered demand, which would lower wholesale supply availability.
Logistics Response Time	A materiel denial delays depot processing time as well as ICP processing time, both of which are sub-segments of LRT.

NMCS Backorder	A materiel denial on a materiel release order for a NMCS demand results in a NMCS backorder.
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Cost Metrics

Description

Definition of Cost as a DoD Supply Chain Attribute

The value of supply chain resources required to deliver a specific performance outcome.

Assessment Objective for Attribute

Determine if the supply chain is providing cost-effective support to its customers and managing inventory in a cost-effective manner.

Attribute Metrics

Outcome Metrics:	Logistics Cost Baseline Tracks the efforts of the DoD supply chain to control its costs by measuring how much DoD operating forces pay for logistics support. Value of Secondary Item Inventory Quantifies the Department's inventory investment that results from the
	inventory management efforts of military service and DLA materiel managers.
Diagnostic Metrics:	Inventory Segmentation of No Demand Items Quantifies the portion of the total inventory investment tied up in items that have experienced no demand in 5 or more years. Can be used to analyze inventory growth or the effectiveness of inventory level setting rules.
	Tiered Inventory Turns Computes an inventory turn for DoD inventories that are purchased or repaired based on forecastable sales.
	Supply Chain Management Costs Quantifies the working capital fund (WCF) overhead costs that are attributable to supply chain management and how they compare to materiel obligations.
	Supply Management Cost Changes Quantifies the changes in overhead and materiel acquisition costs from one year to the next year.

Logistics Cost Baseline

Use of the Logistics Cost Baseline

This metric quantifies the cost of logistics based on dollars that warfighters pay. Since costs incurred by supply chain providers and materiel costs are part of logistics costs, any increase passes to the customer.

Figure 44 shows how the logistics cost baseline (also known as the log cost baseline) metric tracks annual transportation, supply, and maintenance costs over time. During the period of wartime operations, overseas costs climbed. When forces started to withdraw, costs began to decline. Maintenance costs have the slowest rate of decline, as returning equipment must be repaired.

Figure 44. Information Shown on Logistics Cost Baseline Graph



Logistics Cost Baseline (Then Year \$B)

Development of Logistics Cost Baseline

Supported Supply Chain Strategic Objective	Control costs.
Attribute	Cost: By measuring how much the customer pays for logistics support, this metric balances supply chain performance against supply chain costs to ensure objectives are achieved as economically as possible.
External or Internal	External: Compiled from budget and logistics manpower data.

Description of Logistics Cost Baseline

Definition	The total operations and maintenance (O&M) and military and civilian personnel costs by the logistics activities that are primarily under the purview of the Assistant Secretary of Defense for Acquisition, Technology, and Logistics (ASD[L&MR]): supply, maintenance, and transportation.
Business Value	 Measures the success of supply chain cost control projects by showing the outcome of those projects.
	 Improves supply chain decision making by enabling the comprehensive evaluation of performance and cost.
Goals and Trend Analysis	Goals: Not applicable as this metric exists to support analysis. Trend: A downward or upward trend in this metric cannot be evaluated in isolation. For example, an upward trend could be positive if military operations are going up; it may be negative if operations are going down.
Business Rules:	Log cost baseline process (amended in FY2011 to refine some cost estimates) is a compilation of two main components:

Enterprise Metrics

	 Logistics 0&M costs from the OP-32 budget documents Manpower costs for active military, civilian, and reserve logisticians.
OSD Data Requirements	Frequency: The log cost baseline process is performed annually when DoD budget documents become available.
	Content: Financial exhibits for O&M costs and data on manpower costs are used to compile the log cost baseline.
General Display	Costs are portrayed by logistics function (i.e., supply, maintenance, and transportation) and as a percentage of the total DoD budget. Figure 45 shows the general display for log cost baseline.

Relationships with Other Metrics

Key Relationship:

Log Cost Baseline Supply Management Costs	
Supply Management Costs	Supply management costs are built into the prices military customers pay for logistics services. An increase in supply chain costs will increase the log cost baseline.

Value of Secondary Item Inventory

Use of the Value of Secondary Item Inventory

This metric quantifies the value of inventory investment within the DoD supply chain.

Inventory can be valued at different prices, and inventory segments can be included—or excluded—from the "total" value. As a result, alternative values are possible, and the use of these values is tied to how the metric is used. In this case, the value of secondary item inventory metric is used to evaluate the results of inventory management within the Department and the effectiveness of efforts to improve inventory management.

In particular, the value of secondary item inventory metric is important when evaluating the Department's efforts to reduce inventory excess to authorized requirements and retention levels. Accordingly, all inventories, including inventory identified as PRS, are valued the same way. PRS is not devalued to its disposal value, because it is in other inventory value metrics (e.g., this differs from the Supply System Inventory Report [SSIR], which accounts for all inventories at their recognized value; for PRS, that value is its disposal value). Fuel inventories are excluded from this metric because they have no PRS and the volatility in their pricing would unduly affect the metric's value in evaluating inventory management. In-transit inventory, which is reported in the SSIR, is also excluded, because it is not considered on-hand inventory.

The notional graphs in Figure 45 illustrate the general conclusions that can be made from plotting the value of inventory over time (although several assumptions are required). Specifically, the graphs assume no change in demand or performance to customers. They simply show the value of the inventory satisfying demands at the same supply availability. If more inventory is needed to support the same demand, there may be materiel management inefficiencies. If less inventory is needed, materiel management may becoming more efficient.



Figure 45. Assessments from Inventory Value Graphs

If we remove the assumptions that demand and performance are constant over time, the graphs in Figure 46 may have different interpretations.

- If inventory demand increases or declines, the level of inventory should do the same; however, the change in inventory may lag the change in demand.
- If performance increases while demand remains constant, then inventory may increase or materiel management may be more effective.
- If performance declines while demand remains constant, then inventory may decline or materiel management may be less effective.

In short, diagnosing changes in the value of inventory cannot be made in isolation.

One of the most informative aspects of the value of secondary item inventory metric is how it breaks out the major categories of inventory, as shown in Figure 46. Increases or decreases in requirements are reflected in changes within the AAO, while increases or decreases in retention stocks are shown in changes to ERS and CRS. Changes in PRS reflect growth (or a decline) in excess inventory.

Figure 46. Information Shown on Inventory Value Graph



Value of Secondary Item Inventory

Development of Value of Secondary Item Inventory

Supported Supply Chain Strategic Objective	Control costs.
Attribute	Cost: Quantifies the dollar value of the DoD investment in secondary item inventory, which is the outcome of its efforts to right-size inventory to meet customer demand.
External or Internal	Internal: This metric is collected from military service and DLA materiel managers.

Description of Value of Secondary Item Inventory

Definition	The dollar value of DoD secondary item inventory (excluding fuels and in- transit stocks) by inventory segment. The segments are anticipated condemnations (not devalued for disposal) and stocks within the AAO, ERS, CRS, and PRS (not devalued for disposal).
Business Value	Serves as an indicator of growth, decrease, or stabilization in the investment in DoD inventory; identifies the segments of inventory that are changing and the degree of excess inventory.
Goals and Trend Analysis	 Goals: Although no dollar goal exists for this metric, the goals for excess on-hand inventory and validation of retention inventory are related. Trend: A downward or upward trend in the value of inventory cannot be evaluated in isolation. For example, an upward trend can be positive if demand is going up; it may be negative if demand is going down.

	This metric is the sum of all secondary item inventories, excluding fuels and in-transit stocks, valued as follows:
	• Serviceable assets at their moving average cost (MAC)
Computation	• Unserviceable assets at their MAC, less the cost to repair.
	[The metric differs from the inventory reported in the SSIR in that (1) anticipated condemnations and PRS are not devalued to their net realizable value and (2) in-transit stocks and fuels are excluded.]
OSD Data Requirements	Frequency: Semi-annual submission by military services and DLA—end of September values by February 15; end of March values by August 15.
	Content: The dollar values of inventory segments reported for the SSIR and modified to exclude fuels and SSIR in-transit stocks and to revalue anticipated condemnations and PRS to full value.
General Display	Inventory by SSIR categories (less fuels and in-transit) and displays with AAO and CRS breakouts. Figure 46 shows the general display for the value of secondary item inventory.

Relationships with Other Metrics

Key Relationships:

Wholesale Supply Availability Value of Secondary Item Inventory Excess On-Hand	
Excess On-Hand	Quantifies that portion of the DoD investment in secondary item assets that is above the immediate need (AAO), ERS, and CRS. As such, its target is a percentage of the total value of secondary item inventory.
Wholesale Supply Availability	Measures the effectiveness of the wholesale echelon in filling all requisitions. Increasing the amount of assets available to fill requisitions will increase supply availability.

Note on Secondary Items

Reparable components, subsystems and assemblies, consumable repair parts, bulk items and material, and subsistence and expendable end items (including clothing and other personal gear) are all secondary items.

Inventory Segmentation of No Demand Items

Use of the Inventory Segmentation of No Demand Items

The procedures governing the acquisition and retention of inventory are geared toward having inventory for sale. As a result, inventories with low sales prospects should be minimal, particularly inventory for items with no demand in 10 or more years.

The primary use of this metric is to identify opportunities to improve inventory management processes. By conducting in-depth reviews of items with no demand, materiel managers may identify where

• inventory should not be retained,

Enterprise Metrics

- inventory level setting models could be improved to reduce the risk of excess inventory, and
- inventory processes could be improved to avoid (except in the case of insurance items)
 - o stocking any items that have no forecasted demand and
 - the probability of future demand is negligible or zero.

The notional chart in Figure 47 does not indicate any particular level of performance. It shows how inventories for items with no demand in 5 years, 6 years, 7 years, 8 years, 9 years, and 10+plus years are segmented in the major inventory categories of AAO, ERS, CRS, and PRS. This segmentation allows inventory managers to focus on the management procedures associated with no demand item inventories. A decrease in dollars in the 10+ years segment indicates that progress is being made in reducing inventory for items that have low probability of future use.

Figure 47. Information Shown on Graph of Inventory Segmentation of No Demand Items



Inventory Segmentation of No Demand Items

Development of Inventory Segmentation of No Demand Items

Supported Supply Chain Strategic Objective	Effectively and efficiently manage materiel.
Attribute	Cost: Quantifies the dollar value of the DoD investment in inventory for items that haven't had a demand in 5 or more years. As such, may identify candidates for excess inventory reduction.
External or Internal	Internal: Reported to ODASD(SCI) by the military services and DLA as part of their semi-annual inventory management reviews.

Description of Inventory Segmentation of No Demand Items

Definition	Inventory dollars for items with 5 or more years of no demand, further segmented into AAO, ERS, CRS, and PRS.
Business Value	Tracking this metric allows materiel managers to identify where their management procedures may need improvement.
Goals and Trend Analysis	Goals: No goal exists for this metric. Trend: A downward trend in this metric is positive, while an upward trend is negative.
Computation	Items that have no demand in 5, 6, 7, 8, 9, or 10+ years are identified by years of no demand. The years-of-no-demand categories are mutually exclusive. The inventory dollars for each item is collected in AAO, ERS, CRS, and PRS buckets by years-of-no-demand category.
OSD Data Requirements	Frequency : Components submit twice a year—end of September values by February 15; end of March values by August 15. Content : Dollar values of inventory segments (AAO, ERS, CRS, and PRS) for items that have 5, 6, 7, 8, 9, or 10+ years of no demand.
General Display	Stacked histograms of SSIR segments for each year of no demand for 5–9 years and 10+ years. Figure 47 shows the general display for the inventory segmentation of no demand items.

Relationships with Other Metrics

Key Relationship:

Inventory Segmentation of No Demand Items Excess On-Hand	
Excess On-Hand	 Quantifies the portion of the DoD investment in secondary item assets that is above immediate need (AAO), ERS, and CRS. Except for insurance items and items with war reserve requirements, items with no demand should not have demand-based requirements within the AAO or ERS. Consequently, assets for such items should stratify as either CRS or excess on-hand.

Tiered Inventory Turns

Use of the Tiered Inventory Turns

The term "inventory turn" is normally associated with sales. In developing this metric, consideration has been given to turns for segments of inventory (such as ERS and PRS), for which the turn is not sales related.

A chart on inventory turns can have several interpretations because turns are a function of the value of inventory and sales. An improved turn may be undesirable if it is accompanied by lower supply availability. Figure 48 shows the sales declining faster than inventory levels.



Figure 48. Sales Based Inventory Turn

Development of Tiered Inventory Turns

Supported Supply Chain Strategic Objective	Effectively and efficiently manage materiel.
Attribute	Cost: This metric computes turns for different segments of the inventory based on sales or another factor associated with turning a segment.
External or Internal	Internal: The computation of this metric is based on supply chain inventory data, including sales and disposals.

Description of Tiered Inventory Turns

Definition	 The inventory turn for the total inventory is the dollar value of sales for a year divided by the average dollar value of inventory for that year. The inventory turn for sales-based inventory (i.e., on-hand inventory for forecasted AAO requirements) is the dollar value of sales for forecasted items divided by the average dollar value of sales-based inventory for that year. Definitions for other inventory segments are to be determined.
Business Value	Inventory turns provide information on the flow of inventory through the DoD supply system. For forecasted requirements aimed at meeting customer recurring demand, inventory turns are an indicator of effectiveness and efficiency of requirements when combined with wholesale supply availability.

Goals and Trend Analysis	Goals : Not applicable, as this metric is used for analysis. Trend : An upward trend in this metric is positive for sales-based inventory turns if wholesale supply availability remains constant. An upward trend indicates that less inventory is being held to meet demand.
Computation	Average inventory is computed as the sum of the inventory at the beginning of the year and at the end of year divided by 2. Forecasted AAO requirements include retail requisition objectives, due- outs, safety levels, repair cycle levels, lead-time levels, and procurement quantities (as shown in the opening stratification position for serviceable and unserviceable on-hand stocks).
OSD Data Requirements	In development.
General Display	Turns for total inventory and sales-based inventory. Figure 49 shows the general display for tiered inventory turns.



Figure 49. General Display for Tiered Inventory Turns



Relationships with Other Metrics

Key Relationships:

	·······	Excess On-Hand
Wholesale Supply Availability	Tiered Inventory Turns	
		Value of Secondary Item Inventory

Excess On-Hand	Growth in excess on-hand will cause an inventory turn for the total on-hand inventory to decrease.
Value of Secondary Item Inventory	If inventory grows at a higher rate than demand, the number of turns will decrease.
Wholesale Supply Availability	If the number of turns is increasing, wholesale supply availability may decrease because fewer inventories are available to satisfy demand.

Supply Management Costs

Use of the Supply Management Costs

Supply management costs are the overhead costs of acquiring and distributing inventory. Materiel obligations are the costs of purchasing and repairing materiel for eventual sale.

A downward trend in materiel obligations signals that less materiel is being purchased and repaired. This might be in response to a downward trend in sales. A downward trend in overhead costs should accompany the downward trend in materiel obligations; however, there may be some lag because of the longer processes involved in changing overhead costs. Likewise, an upward trend in materiel obligations may be a response to an upward trend in sales. Again, overhead costs should also trend upward, but some lag may occur.

Figure 50 illustrates the general conclusions that can be made by plotting supply management costs over time. The chart on the left illustrates declining materiel obligations relative to management costs; the result is an increasing trend in the ratio of the two. The chart on the right shows increasing materiel obligations relative to management costs; the result is a decreasing trend in the ratio of the two.



Figure 50. Information Shown on Supply Management Costs Graph

Development of Supply Management Costs

Supported Supply Chain Strategic Objective	Control costs.
Attribute	Cost: Quantifies the relationship between the dollar value of supply chain management costs and the value of supply chain materiel obligations.
External or Internal	Internal: Reported annually to ODASD(SCI) to reflect end-of-year execution costs applicable to WCF inventories. The possibility of semi-annual reporting is being researched.

Description of Supply Management Costs

Definition	 The ratio of materiel obligations to supply management costs, where materiel obligations are the net materiel obligations for the purchase or repair of materiel that will be held in inventory or acquired from vendors for direct delivery to customers, and
	 supply management costs are the costs of operations normally associated with overhead, including personnel, receiving, storage, transportation, payroll, personnel travel, other WCF purchases, operating materials and supplies, rent/communications/utilities, and other service contracts.
Business Value	 Relates the annual dollar investment in materiel to costs involved in managing that materiel.
	 Measures the success of supply chain overhead cost-cutting efforts.
Goals and Trend Analysis	Goals: Although no goal exists for this metric, the DoD Comptroller's goal is to ensure supply management costs can be recovered within 2 years, based on the projected volume of sales.
	Trend: Analysis focuses on whether the trends in materiel obligations and management costs are going in the same direction.
	Metric computations are as follows:
	• Supply chain inventory materiel obligations are the sum of materiel acquisition and materiel repairs.
Computation	 Supply management costs are the sum of currently reported overhead costs.
	 The ratio is computed as management costs divided by materiel obligations.
OSD Data Requirements	Frequency: Annually (researching the possibility of semi-annual submission)
	Content: The actual materiel obligations and supply management and support costs for a year in the form of a financial Fund 1 exhibit.
General Display	Supply management costs (overhead costs) and materiel obligations shown by year along with the ratio of overhead costs to materiel obligations. Figure 51 shows the general display for supply management costs.





Supply Management Costs

Relationships with Other Metrics

Key Relationships:



Supply Management Cost Change	Both metrics use the same cost and obligation data. Where the supply management costs metric uses cost and obligation data to compute a yearly ratio, the supply management cost change metric looks at how the costs change from year to year. As such, the supply management cost changes metric can provide insight into changes in the yearly ratios.
Log Cost Baseline	The costs in the log cost baseline represent the prices military customers pay for logistics services. An increase in supply management costs should increase supply costs in the log cost baseline.

Supply Management Cost Changes

Use of the Supply Management Cost Changes

This metric measures how obligations and management costs for WCF supply management activities are changing over time. In addition, it measures how the two main categories of costs are affecting the total costs of supply management activities.

Changes in costs should reflect changes in customer demand as well as changes in infrastructure and business practices that are aimed at reducing costs. They may also identify instances when changes in infrastructure or business practices lead to cost increases.

Figure 52 illustrates how management costs and materiel obligations change from one year to the next. The changes can be in the same direction (i.e., positive or negative) or in different directions (i.e., one positive and one negative).



Figure 52. Information Shown on Supply Management Cost Changes Graph

Development of Supply Management Cost Changes

Supported Supply Chain Strategic Objective	Control costs.
Attribute	Cost: The key to efficient cost control is controlling the growth in the price the Department pays for the materiel and the cost of managing that materiel.
External or Internal	Internal: Using the same input as the supply management cost metric, this metric quantifies how WCF materiel obligations and supply management costs change from one year to the next and the effect of those changes on the supply management activity costs.

Supply Management Cost Changes

Description of Supply Management Cost Changes

Definition	 Dollar values of annual changes to management costs and materiel obligations, where management costs are the sum of supply management overhead costs; materiel obligations are the sum of materiel acquisition and repair obligations, or total cost minus overhead costs; dollar value of annual changes is the delta between previous-year and current-year costs
Business Value	Indicates how much obligations and costs are changing and the net change in costs. Captures the trends associated with changes to supply management obligations and costs. Complements the supply management costs metric by providing more data about why the ratio changes over time.
Goals and Trend Analysis	Goals: Although no goal exists for this metric, the DoD Comptroller monitors the effect of supply management cost changes on prices and the solvency of the Defense Working Capital Fund.Trend: Analysis will identify if the costs are moving in the same direction or, if they are moving in opposite directions, the net change.
Computation	 Metric computations are as follows: Materiel obligations are the sum of materiel acquisition and materiel repair costs. Supply management costs are the sum of currently reported overhead costs. Total cost for a supply management activity is the sum of its management costs and its purchasing and repair costs. The deltas would be current-year values minus previous-year values. If the total of the changes in supply management costs and materiel obligations is positive (or negative), but both of the changes are not positive (or negative), then the change that is positive (or negative) is responsible for 100% of the change, and the other has zero responsibility.
OSD Data Requirements	Frequency: Annually. (Researching possibility of semi-annual submission.) Content: The actual materiel obligations and supply management costs for a year in the form of a financial Fund 1 exhibit.
General Display	 The following are shown as the metric: The 12-month deltas in supply management costs. The 12-month deltas in supply chain materiel obligations. The 12-month deltas in total cost or net change. Figure 53 shows the general display for supply management cost changes.



Supply Management Cost Changes

Figure 53. General Display for Supply Management Cost Changes

Relationships with Other Metrics

Key Relationship:

Supply Management Cost Changes Supply Management Costs	
Supply Management Costs	Measures the materiel obligations and supply and management costs for a particular year. The supply management cost changes metric computes the difference in those obligations and costs between two consecutive years.

Planning and Precision Metrics

Description

Definition of Planning and Precision as a DoD Supply Chain Attribute

The ability of the supply chain to accurately anticipate customer requirements and plan, coordinate, and execute accordingly.

Assessment Objective for Attribute

Determine if inventory management within the supply chain is improving.

Attribute Metrics

Outcome Metrics:	Excess On-Hand Quantifies the efforts of supply chain managers to reduce excess on-hand inventory.
	Due-In Potential Future Excess Quantifies the efforts of supply chain managers to reduce the number of DILS on contract.
Diagnostic Metrics:	Demand Forecast Accuracy and Bias Measures the accuracy of demand forecasts used to build inventory levels, and quantifies any bias toward over- or under-forecasting.
	Unserviceable DLR Return Times Measures the time to move unserviceable DLR assets from the field to where they can be repaired or placed in storage for later repair. A lack of timeliness with unserviceable DLR returns will contribute to unnecessary growth in inventory or an increase in the number of backorders.
	Unserviceable DLR Over-Aged Due-Ins Quantifies the number of returns that are late. A lack of timeliness with unserviceable DLR returns will contribute to unnecessary growth in inventory or an increase in the number of backorders.
	Procurement Lead Time Quantifies the time it takes for materiel managers to order and receive materiel from DoD supply chain suppliers. Changes in the average procurement lead time can contribute to inventory growth or reduction.
	Procurement Lead Time Variance Quantifies the difference between the actual administrative and production lead

times (ALT and PLTs) and those used for supply planning. Large variances could

contribute to inventory growth or reduction.

Excess On-Hand

Use of Excess On-Hand

As one of the primary inventory management metrics, the excess on-hand metric quantifies the portion of the DoD inventory that is excess (i.e., not within the AAO and not held for economic or contingency reasons). The retention of excess on-hand inventory is a negative indicator of either the Department's ability to manage inventory or changes in materiel requirements. Changes in materiel requirements may occur as a result of circumstances beyond the control of inventory managers. The following are examples:

- Materiel rendered obsolete because of an engineering change to the configuration of the system that it supported.
- Increases or decreases in the demand for materiel as a result of new contingencies or drawdowns from contingencies.
- The phasing in of new weapon systems and the phasing out of old weapon systems—both of which change the requirements for supporting materiel.

The excess on-hand metric is given as a percentage to allow for targets that are independent of the total value of inventory.

The notional graphs in Figure 54 the general conclusions that can be made from plotting excess onhand over time. An increase (or negative trend) in the excess on-hand indicates either falling requirements or declining retention levels.



Figure 54. Assessments from Excess On-Hand Graph

Development of Excess On-Hand

Supported Supply Chain Strategic Objective	Effectively and efficiently manage materiel.
Attribute	Planning and Precision : Shows the dollar value of inventory that is excess to the AAO (i.e., the total authorized requirement for an item) and is not needed for economic retention or contingency retention.
External or Internal	Internal : Reported to ODASD(SCI) by the military services and DLA as part of their semi-annual inventory management reviews.

Description of Excess On-Hand

Definition	The dollar value of secondary item inventory that is categorized as potential excess at the end of the measured period, and the percentage of the total inventory dollars that potential excess constitutes. Potential reutilization stock, or PRS, is considered excess on-hand inventory.
Business Value	Quantifies the Department's success in reducing excess on-hand inventory by showing the outcome of reduction efforts against the target for reducing excess on-hand.
Goals and Trend Analysis	Goals : 10% for FY2013–14, 9% for FY2015, and 8% for FY2016.
	Trend : A downward trend in this metric is positive, while an upward trend is negative.
Business Rules:	All secondary item on-hand assets are valued as follows:
	 Serviceable assets at their MAC. Unserviceable assets at their MAC less the cost of repair
OSD Data Requirements	September values by February 15; end of March values by August 15.
	Content : Dollar value of PRS and percentage of total value of inventory that is excess.
General Display	The value of PRS at full price, its value as a percentage of the total inventory value, and goal. The metric can be displayed DoD-wide or by component. Figure 55 shows the general display for excess on-hand.



Government Managed Excess On-Hand

Figure 55. General Display for Excess On-Hand

Relationships with Other Metrics

Key Relationships:

	``````````````````````````````````````	Supply Management Costs
Excess On-Hand		
	·	Value of Secondary Item Inventory

Supply Management Costs	Excess on-hand increases the cost of storing materiel. The cost of storing materiel is one of the supply management costs submitted for the supply management cost metric.
Value of Secondary Item Inventory	Excess on-hand increases the total value of secondary item inventory.

# **Due-In Potential Future Excess**

#### **Use of Due-In Potential Future Excess**

As the second of two primary inventory management metrics, this procurement due-in metric quantifies the portion of DoD's secondary item materiel that is on contract, above requirements as expressed in the AAO, and stratifies as PRS.

DoD procedures establish procurement quantities that are within AAO requirements; however, those requirements can change over time—after procurements are on contract. This may cause on-

contract assets to stratify above AAO requirements, even though DoD procurement procedures do not include quantities that are targeted for retention stocks or excess stocks at the time of award.

To avoid bringing excess assets into the DoD supply system, the Department reviews all on-contract dollars identified as above AAO requirements. The purpose of the review is to determine if the contract should be retained as is, or if all or part of the contracted amount should be terminated. Review procedures include economic modelling. Besides economics, a review may determine that it is in the best interest of the government to retain the contract, for such reasons as the identification of new requirements, the need to secure the industrial base, diminishing manufacturing sources, quantity discounts, or long-term contract requirements. All reasons for not terminating contracted assets above the AAO must be documented.

By quantifying DILS, DoD captures the size of the review effort and the probability of bringing long supply into the DoD supply system. Like the excess on-hand metric, DILS is given as a percentage of the total due-in to allow for targets that are independent of the total value of contracted inventory.

The notional graphs in Figure 56 illustrate the general conclusions that can be made from plotting due-in potential future excess over time. An increase (or negative trend) in the dollars show in the bottom right chart in Figure 58 indicates more or less excess scheduled for delivery.



Figure 56. Assessments from Due-In Potential Future Excess Graph

The DILS graph in Figure 57 shows what portion of the long supply stratifies to economic retention, contingency retention, and potential reutilization, as well as the percentage of total due-ins (i.e., on-order) that is long supply, the percentage that is due-in retention, and the percentage that is due-in potential future excess (no anticipated future demand). Figure 58 shows how information in Figure 57 is broken out into separate charts.



Figure 57. Information Shown on Due-In Long Supply Graph

## **Development of Due-In Potential Future Excess**

Supported Supply Chain Strategic Objective	Effectively and efficiently manage materiel.
Attribute	<b>Planning and Precision</b> : Quantifies the efforts of supply chain managers to reduce the number of DILS on contract that will result in excess inventory if delivered.
External or Internal	<b>Internal</b> : Reported to ODASD(SCI) by the military services and DLA as part of their semi-annual inventory management reviews.

#### **Description of Due-In Potential Future Excess**

Definition	DILS is the dollar value of the secondary item on-contract procurements that exceed current item AAO requirements and the percentage of the total on- contract procurement dollars that those dollars constitute. DILS is reviewed for possible contract retention or termination and the percentage of total on- contract procurement dollars.
	Potential retention on-order is synonymous with on-order amounts that stratify to ERS and CRS.
	Due-in potential future excess is that part of DILS that stratifies as PRS.
Business Value	This metric quantifies the Department's success in reducing excess inventories coming into the DoD supply system by showing the outcome of reduction efforts against the target for reducing DILS that is PRS.

**Enterprise Metrics** 

Goals and Trend Analysis	<b>Goals:</b> 6% for FY2014; 5% for FY2015; and 4% for FY2016.
	<b>Trend:</b> A downward trend in this metric is positive, while an upward trend is negative.
Computation	• DoD components compute DILS by summing the dollars on contract that are above item AAOs.
	• DoD components compute DILS potential reutilization by summing the dollars on contract that are PRS.
	• DoD components compute DILS economic retention by summing the dollars on contract that are ERS.
	• DoD components compute DILS contingency retention by summing the dollars on contract that are CRS.
	<ul> <li>All secondary item on-contract assets are evaluated at their standard price (i.e., full price).</li> </ul>
OSD Data Requirements	Frequency: Semi-annual submission by the military services and DLA—end of September values by February 15; end of March values by August 15.
	Content: Dollar value of total on-contract stocks; dollar values of DILS broken out by ERS, CRS, and PRS; long supply percentage of on-order total; long supply retention percentage of on-order total.
General Display	The display for this metric consists of the total on-order value: the values of the DILS economic retention, contingency retention, and potential reutilization, and the percentages for DILS retention and DILS reutilization. It can be displayed DoD-wide or for each military service or DLA. Figure 58 shows the general display for DILS, which includes the breakout of percentages for DILS retention and DILS reutilization.



#### Figure 58. General Display for Due-In Long Supply

#### **Relationships with Other Metrics**

#### Key Relationships:



Excess On-Hand	When received in the supply system, DILS may become PRS unless requirements have changed by the time it is delivered.
Supply Management Costs	DILS will increase management costs because the item manager and contracting officer must determine whether to retain or terminate a contract. If not terminated, the cost of receiving and stowing the delivery increases. Both of these costs are part of supply management costs.

# **Demand Forecast Accuracy and Bias**

#### Use of the Demand Forecast Accuracy and Bias

A demand forecast (for items with forecastable demand) is the basis for setting requirements levels. The results of inaccurate forecasts could be backorders or excesses.

A bias toward over-forecasting will set requirements levels higher than needed, which will lead to excess inventory. A bias toward under-forecasting will set requirements levels lower than needed, which will lead to shortages and backorders. By measuring accuracy and bias, this metric provides

materiel managers with useful input to their requirements determination and demand planning process.

Trends in the demand forecast accuracy and bias metric can show if actions taken to improve forecasting are working at the aggregate level. Comparing the metric to the value generated by a naïve forecast can indicate if the forecast process is adding value. An example of a naïve forecast is a forecast that assumes that next year's demand will be the same as last year's demand. If a naïve forecast produces a higher accuracy and lower bias, then the forecast process needs to be targeted for improvement.

This approach to benchmarking first determines the forecast accuracy and bias associated with the naïve forecast. Thereafter, forecast accuracy and bias are computed for the forecasting technique used by a DoD component during its requirements determination or demand planning process. In essence, the naïve forecast re-baselines forecast accuracy and bias in each forecasting cycle. The forecast accuracy and bias from the naïve forecast and the component's forecast are then compared. The component's forecasting technique fails if the accuracy and bias of the forecast is worse than that of the naïve forecast.

The naïve forecast can also be used to determine the volatility of demand. In general, a large bias associated with the naïve forecast indicates demand is more volatile. Applying a forecasting algorithm to items with infrequent demand or to items with highly variable demand may produce an unacceptably low level of accuracy. It is sometimes better to base the stock requirements for items with volatile demand on minimum/maximum levels, which produce better customer support.

Other improvements could result from using appropriate forecasting algorithms or proper values for forecasting parameters, or from ensuring that manual overrides are legitimate and provide a higher degree of accuracy.

The notional graphs in Figure 59 illustrate the general conclusions that can be made from plotting forecast accuracy over time. A decrease or negative trend in accuracy could be related to dynamic changes in customer demand or poor forecasting techniques or adjustments.



Figure 59. Assessments from Forecast Accuracy Graph

The notional graphs in Figure 60 illustrate the general conclusions that can be made from plotting bias over time. Since bias can indicate either over- or under-forecasting, it can be positive or negative, respectively.

# Figure 60. Assessments from Forecast Bias Graphs





#### **Positive Trend in Bias**



# Negative Anomaly



## Positive Trend in Bias



Performing within Historical Norms



#### **Development of Demand Forecast Accuracy and Bias**

Supported Supply Chain Strategic Objective	Accurately forecast customer materiel needs.
Attribute	<b>Planning and Precision</b> : Forecasts are the basis for most materiel management decisions for items with forecastable demand, which represent the majority of sales.
External or Internal	<b>Internal</b> : Metric and supporting data reported to ODASD(SCI) by the military services and DLA as part of semi-annual inventory management reviews.

#### Description of Demand Forecast Accuracy and Bias

<b>Definition</b> The difference between actual demand and forecasted demand, s manner that quantifies any bias toward over- or under-forecasti positive or absolute value of that difference is used for accuracy, actual value (or signed value) of that difference is used for bias.	stated in a ng. The while the
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Business Value Goals and Trend Analysis	<ul> <li>Measuring and improving the accuracy and bias of demand forecasts will result in</li> <li>greater precision in planning procurement, repair, and distribution actions;</li> <li>inventory levels that better satisfy customer demand, while still reducing excess; and</li> <li>more stability with suppliers.</li> </ul> The focus is on two benchmarks: <ul> <li>Commercial benchmarks for similar operations (yet to be determined)</li> <li>Value-added benchmarks that compare naïve forecasts against current forecasts to show value of forecasting efforts (the naïve forecast is last</li></ul>
	year's demand).
Computation	<ul> <li>Item Population: Accuracy and bias is only computed for forecastable items.</li> <li>Demand Data: Accuracy and bias will be computed using 12-month demand forecasts and actual demand for those same 12 months.</li> <li>Formulas: <ul> <li>Accuracy: (1 – [dollar-weighted absolute forecast error ÷ dollar-weighted demand]) × 100%.</li> <li>Bias: (Dollar-weighted signed forecast error ÷ dollar-weighted demand) × 100%.</li> </ul> </li> </ul>
OSD Data Requirements	<b>Frequency:</b> Semi-annual submission by military services and DLA—end of September values by February 15; end of March values by August 15. <b>Content:</b> The accuracy and bias of annual demand forecasts, including the numerator and denominator for the accuracy and bias calculations, and the accuracy distribution of items and dollar demand with a segmentation that allows for DoD roll-up.
General Display	<ul> <li>The display for this metric consists of</li> <li>component aggregate forecast accuracy measurements;</li> <li>component aggregate forecast bias measurements;</li> <li>DoD-wide item and dollar distributions based on accuracy bands of &lt;0%, 0-20%, 20-40%, 40-60%, 60-80%, and 80-100% (For purposes of the distribution display, negative forecast accuracy is shown as zero.); and</li> <li>value-added measurements. (Value-added displays show the accuracy and bias comparison between the naïve and actual forecasts for consumable and reparable items and for all items.)</li> <li>Figure 61 shows the general display forecast accuracy and forecast bias measurements. Figure 62 shows the general display for the DoD-wide item and dollar distributions based on accuracy bands described above. Figure 63 shows the general display for value-added measurements.</li> </ul>
Figure 61. General Display for Forecast Accuracy and Forecast Bias



### **Forecast Accuracy**

**Forecast Bias** 



Figure 62. DoD-wide Item and Dollar Demand Accuracy Distributions



#### **DoD Item and Dollar Demand Accuracy Distributions**

#### Figure 63. Forecast Accuracy and Bias Value-Added Measurements⁶

Component	Date	Item Count	Accuracy (Perfect = 100%)		Bias (Perfect = 0%)	
			Naïve	Actual	Naïve	Actual
Army	Sep-13	25,761		10.7%	- <u></u>	57.9%
	Mar-14	13,681	-	32.0%		36.4%
Navy	Sep-13	55,474	58.2%	49.2%	4.2%	14.2%
	Mar-14	45,269	60.4%	50.1%	4.6%	15.1%
Air Force	Sep-13	14,207	67.5%	64.2%	16.0%	9.9%
	Mar-14	12,682	68.5%	62.0%	13.2%	-5.0%
USMC	Sep-13		-	-	-	-
	Mar-14	421	-	25.1%	-	1.9%
DLA	Sep-13	272,799	-185.1%	30.2%	242.9%	41.5%
	Mar-14	90,195	< 0%	53.0%	80.6%	11.3%

⁶ Currently, USMC is unable to compute Naïve forecast accuracy and bias. USMC is working to provide forecast accuracy and bias data for March 2015. Army's computation for computing Naïve forecast accuracy and bias is not consistent with the other Components; Army is working towards submitting the data for March 2015.

### Relationships with Other Metrics

Key Relationships:



Excess On-Hand	Over-forecasting and any bias toward over-forecasting can cause excess on- hand; stock levels are acquired and stored but demand does not occur at a level to support those levels.
Due-In Long Supply	Over-forecasting and any bias toward over-forecasting can result in DILS, as procurements are awarded but re-computation with actual demand calls for contract terminations.
Wholesale Supply Availability	Under-forecasting and any bias toward under-forecasting can degrade wholesale supply availability by causing the supply system to acquire and stock fewer assets than needed to fill demand.

### **Unserviceable DLR Return Times**

#### Use of the Unserviceable DLR Return Times

Stable and timely return of unserviceable DLR assets minimizes delays at maintenance depots and the associated awaiting carcass (AWC) time. However, if times are increasing, that may increase AWC times and eventually lead to increases in backorders.

Rapid returns ensure a steady supply of unserviceable assets available for repair, thereby reducing the risks of backorders or excess order stocks.

The notional graphs in Figure 64 illustrate the general conclusions that can be made from plotting return times over time. Increasing times are negative, in that they show greater delays in returning unserviceable materiel. Decreasing times are positive, in that they show shrinking delays. One-time spikes or jumps in return times are negative anomalies that should be researched to determine their cause.

#### Figure 64. Assessments from Unserviceable DLR Return Times Graph



#### Development of Unserviceable DLR Return Times

Supported Supply Chain Strategic Objective	Work with suppliers to ensure timely acquisition of materiel.
Attribute	<b>Planning and Precision</b> : Supply planning relies on unserviceable DLR returns to maintain a flow of assets through maintenance for repair and subsequent re-issue. Timely return of unserviceable materiel is essential to maintenance planning and execution.
External or Internal	<b>Internal</b> : This metric is tracked by the military services' materiel managers.

#### Description of Unserviceable DLR Return Times

Definition	The sum of base-processing time and in-transit time for an unserviceable DLR return. It begins when an organizational- or intermediate-level maintenance activity turns in (to supply) an unserviceable DLR asset that it cannot repair; it ends when the receipt of the unserviceable asset by a distribution depot or maintenance contractor is recorded by the materiel manager.
Business Value	<ul> <li>Measures the timeliness of unserviceable DLR returns for induction into maintenance programs.</li> <li>Aids in supporting successful maintenance planning and execution.</li> <li>Can be used to evaluate the synchronization of sustainment strategies, and thereby reduce the risk of increasing excess on order.</li> </ul>
Goals and Trend Analysis	<ul><li>Goals: Although no goals exist for this metric, the objective is to show improvement over time.</li><li>Trend: An upward trend is negative, while a downward trend is positive.</li></ul>

**Enterprise Metrics** 

Computation	The metric is computed as the median return time for unserviceable DLR returns during the reporting period. The median time is the midpoint of all the return time observations (the time at which 50% of the observations are below and 50% above).
OSD Data Requirements	<b>Frequency</b> : Quarterly. <b>Content</b> : The median return time and number and dollar value of unserviceable DLR returns in a quarter, broken out by CONUS and OCONUS origins.
General Display	Number of returns, return time, and value of returns over time for CONUS and OCONUS by military service. Figure 65 shows the general displays for unserviceable DLR return time.

Figure 65. General Display for Unserviceable DLR Return Time





#### Value of Unserviceable DLR Returns \$500 Millions of Dollars \$400 \$300 \$200 \$100 \$0 FY13 Q1 FY13 Q2 FY13 Q3 FY13 Q4 FY14 Q1 FY14 Q2 \$449 \$356 \$344 \$333 \$302 \$270 Value of Returns CONUS Value \$192 \$198 \$174 \$164 \$191 \$220

\$146

\$159

\$138

\$79

#### **Relationships with Other Metrics**

OCONUS Value

\$229

\$164

Key Relationships:



Wholesale Supply Availability	If unserviceable DLR assets are not returned to maintenance facilities in a timely manner, maintainers will not be able to meet their production schedules and serviceable assets needed to fill demand will not be available as planned. The resulting backorders will adversely affect wholesale supply availability.
Value of Secondary Item Inventory	Increasing return turns will drive inventory increases as additional spares will need to be purchased to cover demand while maintainers are waiting for carcasses to repair.

### Unserviceable DLR Over-Aged Due-Ins

#### Use of the Unserviceable DLR Over-Aged Due-Ins

The unserviceable DLR over-aged due-ins metric helps identify areas to research problems in the number or dollar value of over-aged due-ins of unserviceable DLR returns. It can also be used as an indicator of potential problems with overseas unserviceable returns, CONUS returns, or both.

If the number or value is increasing, then the risk of greater financial loss will increase, as will the risk of more backorders and the need for premature buys. If the number of over-aged due-ins is going down, that should mean fewer AWC delays at the maintenance line and more time to repair.

The notional graphs in Figure 66 illustrate the general conclusions that can be made from plotting over-aged due-ins over time.



Figure 66. Assessment from Unserviceable DLR Over-Aged Due-Ins Graph

### Development of Unserviceable DLR Over-Aged Due-Ins

Supported Supply Chain Strategic Objective	Effectively and efficiently manage materiel.
Attribute	<b>Planning and Precision</b> : Supply planning relies on unserviceable DLR returns to maintain a flow of assets through maintenance for repair and subsequent re-issue. Timely return of unserviceable materiel is essential to maintenance planning and execution.
External or Internal	<b>Internal</b> : This metric is tracked by the military services' materiel managers.

### Description of Unserviceable DLR Over-Aged Due-Ins

Definition	The number and dollar value of unserviceable DLR return actions that do not have a receipt at commercial or inter-service depot maintenance activity or storage activity (i.e., a Military Standard Transaction Reporting and Accountability Procedures [MILSTRAP] transaction with a D6 document identifier) within the days allowed from the date on the organizational or intermediate supply activity turn-in document (i.e., a MILSTRAP transaction with a D7 document identifier). The days allowed differ by military service.
Business Value	<ul> <li>Measures the timely return of unserviceable DLR assets for induction into maintenance programs.</li> <li>Supports successful maintenance planning and execution.</li> <li>Synchronizes sustainment strategies and reduces risk of increasing excesses on-order.</li> </ul>
Goals and Trend Analysis	<ul><li>Goals: Although no goals exist for this metric, the objective is to show improvement over time.</li><li>Trend: An upward trend is negative, while a downward trend is positive.</li></ul>
Computation	<ul> <li>The following age criteria are used to identify over-aged due-ins:</li> <li>Army: over 180 days (CONUS) and over 270 days (OCONUS).</li> <li>Navy: for returns in the Navy's Carcass Tracking Shipper/System, over 45 days but less than 1 year (greater than 1 year considered an inventory loss); for other returns in the Navy's Stock-in-Transit (SIT) file, over 120 days.</li> <li>Air Force: over 60 days.</li> <li>Marines: over 60 days.</li> </ul>
OSD Data Requirements	<b>Frequency</b> : Quarterly. <b>Content</b> : The number and dollar value of unserviceable DLR over-aged due-ins at the end of a quarter, broken out by CONUS and OCONUS origins.
General Display	Numbers and values over time for CONUS and OCONUS by military service. Figure 67 shows the general display graphs for unserviceable DLR returns over-aged due-ins.





#### Figure 67. General Display for Unserviceable DLR Returns Over-Aged Due-Ins

#### **Relationships with Other Metrics**



\$379

\$309

\$70

\$409

\$320

\$89

\$387

\$273

\$114

Unserviceable DLR Return Times	Over-aged due-ins will extend return times. If over-aged due-ins are increasing, return times are also increasing, which increases backorders and inventory. Therefore, improvements in over-aged due-ins relate to improved return times.
Wholesale Supply Availability	If unserviceable DLR assets are not returned to maintenance facilities in a timely manner, maintainers will not be able to meet their production schedules, and serviceable assets needed to fill demand will not be available as planned. The resulting backorders will adversely affect wholesale supply availability.

### **Procurement Lead Time**

#### **Use of the Procurement Lead Time**

The procurement lead time metric quantifies the average time it takes to procure materiel from commercial suppliers (calculated by taking the sum of ALT and PLT). Reducing that time provides more agility in inventory management, because the time to recover from inventory shortages is reduced. Also, since inventory is held to cover demand during the procurement lead time, a reduction in the lead time would also reduce the overall investment in inventory.

The notional graphs in Figure 68 illustrate the general conclusions that can be made from plotting lead times over time. Increasing ALTs or PLTs are negative, in that they translate to increases in lead time and safety level requirements, which constitutes a need for an increased investment in inventory. Decreasing times are positive, in that they translate to fewer requirements and less investment in inventory. One-time spikes or jumps in times are negative anomalies that can cause backorders. These anomalies should be researched to identify their cause.

### Figure 68. Assessments from Procurement Lead Time Graph



#### **Development of Procurement Lead Time**

Supported Supply Chain Strategic Objective	Work with suppliers to ensure timely acquisition of materiel.
Attribute	<b>Planning and Precision</b> : Supply planning relies on accurate procurement lead times to ensure delivery of materiel according to schedule to meet expected customer demand.
External or Internal	Internal: Computed by the military service and DLA materiel managers.

#### Description of Procurement Lead Time

Definition	Procurement lead time is the sum of ALTs and production lead times.
	• ALT is the time interval between initiation of a purchase request and the date of signature on a representative contract.
	• PLT is the time interval between the award of a representative contract and receipt of the first significant delivery of purchased materiel into the supply system. For secondary items, procurement lead time is synonymous with acquisition lead time.
	Reductions in procurement lead time
Business Value	<ul> <li>could result in a cost avoidance in safety level requirements, and</li> </ul>
	<ul> <li>enable more accurate inventory investments through shorter planning horizons.</li> </ul>
Goals and Trend Analysis	<b>Goals</b> : Although no numeric goals exist for this metric, the objective is to shorten lead times where it is economical to do so and still maintain effectiveness.

	<b>Trend:</b> Upward trends in either actual or planned lead times translate to an increasing potential for backorders and increased safety levels.
Computation	DoD 4140.1-R (and the draft DoD 4140.01-V02) contains the rules for starting and ending ALT and PLT.
OSD Data Requirements	<ul> <li>Frequency: Semi-annual submission by the military services and DLA.</li> <li>Content: Each submission will have the following for the past two quarters:</li> <li>The average ALT for items awarded contracts in a quarter.</li> <li>The average PLT for items with procurements delivered in a quarter.</li> </ul>
General Display	Actual and planned ALTs, PLTs, and total procurement lead times are displayed. "Actual" values are observed times taken from actual procurements. "Planned" values are the times used for computing inventory requirements levels. Figure 69 shows the general display for procurement lead time.

#### Figure 69. General Display for Procurement Lead Time



### Planned versus Actual Mean ALT



## Planned versus Actual Mean PLT

**Enterprise Metrics** 

#### Relationships with Other Metrics

Key Relationships:

		Procurement Lead Time Variance
Procurement Lead Time		
	,	Value of Secondary Item Inventory

Procurement Lead Time Variance	Procurement lead time variance is derived from procurement lead time measurements. Planned times that go into measuring variance are based on historical measurements, while the actual times that go into measuring variance are current measurements of lead times. The procurement lead time variance determines the validity of the planned procurement lead times.
Value of Secondary Item Inventory	An inventory requirement is to cover demand when inventory levels are being replenished. Both procurement ALT and PLTs have associated requirements. Assets held to meet those requirements are part of secondary item inventory. An increase in those times will increase the requirements, which will, in turn, increase the value of inventory held to meet those requirements.

### **Procurement Lead Time Variance**

#### Use of the Procurement Lead Time Variance

The procurement lead time variance metric quantifies the average time to procure materiel from commercial suppliers. Reducing that time provides more agility in inventory management, because the time to recover from inventory shortages (i.e., backorders) is reduced. Also, since inventory is held to cover demand during the procurement lead time, a reduction in the time would also reduce the overall investment in inventory. Finally, the forecast of demand over the lead time could be more accurate because the impact of any forecast error is reduced with smaller variance.

ALT variance measures the difference between the ALT used to plan a procurement action and the actual ALT. If the time difference is positive, the planning ALT is overstated. If it is negative, the planning ALT is understated. The same is true of PLT variance, which measures the difference between the PLT used to plan a procurement action and the actual PLT. A variance with an absolute value of 30 days or less is considered good.

The notional graphs in Figure 70 illustrate negative and positive trends in variance in either ALT or PLT. A variance is negative if it is outside the 30-day band.

#### Figure 70. Assessments from Lead Time Variance Graph







Positive Trend in Variance

#### Positive Trend in Variance



#### Development of Procurement Lead Time Variance

Supported Supply Chain Strategic Objective	Work with suppliers to ensure timely acquisition of materiel.
Attribute	<b>Planning and Precision</b> : Looks at the precision in the timing that goes into planning and executing buys. For supply planning to accurately schedule and execute procurement actions, the lead times used by planners needs to be as close as possible to the actual lead times.
External/Internal	<b>Internal</b> : Computed by the military service and DLA materiel managers using the same data as the procurement lead time metrics.

#### Description of Procurement Lead Time Variance

Definition	The variance or difference between actual lead times and lead times used to build requirements, where the lead times are ALT and PLT.	
Business Value	<ul> <li>Provides information how well buyers and suppliers can meet lead times of record.</li> <li>If reduced, improves the accuracy of supply planning and, thereby,</li> </ul>	
	reduces the risks of excess inventories and unexpected backorders.	

**Enterprise Metrics** 

Goals and Trend Analysis	<b>Goal</b> : The target range for each variance is $\pm 30$ days.	
	<b>Trend</b> : A trend that reduces variance is positive, in that it equates to more accurate forecasts of procurement awards and deliveries.	
Computation	• ALT variance for a procurement action is equal to the planned ALT (when the purchase request was generated) minus the actual ALT as of contract award.	
	<ul> <li>PLT variance for a procurement action is equal to the planned PLT (when the purchase request was generated) minus the actual PLT as of the receipt confirmation of a significant vendor delivery.</li> </ul>	
	• If an item has multiple occurrences of ALT or PLT variance in a quarter, they are averaged (summing the variance and dividing by the number of variances).	
	<b>Frequency</b> : Semi-annual submission by the military services and DLA.	
	<b>Content</b> : Each submission will have the following for the past two quarters:	
OSD Data Requirements	• The number of items awarded contracts in a quarter and the difference between the actual ALT and the ALT in the file at the time the procurement request was generated.	
	<ul> <li>The distribution of items based on ALT differences in 30-day intervals, going from –300 days to 300+ days.</li> </ul>	
	• The number of items for which procurements were delivered in a quarter and the difference in the actual PLT and the PLT at the time the procurement was awarded.	
	<ul> <li>The distribution of items based on PLT differences in 30-day intervals, going from –300 days to 300+ days.</li> </ul>	
General Display	Actual and planned ALT, PLT, and total procurement lead time are displayed. "Actual" values are observed times taken from actual procurements. "Planned" values are the times used for computing inventory requirements levels. Figure 71 shows the general display for procurement lead time variance.	





#### **DoD Lead Time Variance**

#### **Relationships with Other Metrics**



Procurement Lead Time	The lead times used in planning are updated with actual lead times. If the differences between planned times and actual times remain large, the accuracy of planned times is reduced.
Excess On-Hand	Early deliveries can temporarily cause excess on-hand, because procured stock is obtained before it is needed.
Wholesale Supply Availability	Late deliveries can degrade wholesale supply availability because stock is not available when it is needed to fill demand.

# Metrics Associated with Improving Inventory Management

1 60 1

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## **Metrics Associated with Improving Inventory Management**

The DoD developed the Comprehensive Inventory Management Improvement Plan (CIMIP) to document and guide its collective efforts to improve inventory management and support to the warfighter. The overall objective of the CIMIP (the Plan) was a prudent reduction in current inventory excesses as well as a reduction in the potential for future excesses without degrading materiel support to the customer.

The Plan establishes improved ways to invest resources and manage the Department's inventory. To track progress, functional level metrics were established as measures of success. The metrics are intended to monitor progress toward specific objectives:

- Reduce or terminate orders to ensure the inventory accurately reflects actual needs.
- Enhance the methods for determining the amount of inventory to retain.
- Ensure timely review and disposal of excess inventory.

To help accomplish these objectives, the Plan identifies ongoing efforts within the military services and DLA, along with Department-wide actions that enable the effective execution of the Plan.

This section of the DoD Supply Chain Metrics Guide contains detailed information on the suite of established inventory management functional metrics, separated by desired outcomes. That information includes e comprehensive description of each metric and instructions on how it should be used. Charts showing measurements over time are included to help interpret the performance of each metric.

As noted previously, the health of the DoD supply chain cannot be determined by a single metric. The same is true in measuring the success of inventory management improvement efforts.

A comprehensive assessment of DoD inventory management performance requires a review of all enterprise level metrics and inventory management functional metrics in this Guide and their interrelationships. In some cases, performance cannot be determined by looking at the metric itself; it must be assessed in concert with the performance of other related metrics. In such cases, the related metrics are provided for review in conjunction with the targeted metric.

### **Inventory Management Metrics by Desired Outcome**

### Desired Outcome for Total Asset Visibility

#### **Objective**

Minimize the size of buys by considering all inventories in the system.

Associated Metrics: Inventory Accessibility Quantifies the percentage of inventory in component inventory management systems that other organizations or materiel inventory management systems can automatically access if negotiated or preapproved by the owner of the assets.

### **Desired Outcome for Economic Retention**

#### **Objective**

Ensure economic retention decisions are based on current cost factors and economic principles.

Associated Metrics: ERS as a Percentage of Total Inventory Quantifies the dollar value of ERS as a percentage of the total dollar value of all on-hand stock. Economic Benefit of ERS

Quantifies the dollars saved for every dollar spent to retain current ERS (i.e., the ratio of savings to costs for ERS). If an item has an ERS benefit ratio of less than 1, its current level of ERS is not economical.

### **Desired Outcome for Contingency Retention**

#### **Objective**

Ensure contingency retention stockage is justifiable in terms of the possible future need to support contingency use.

Associated Metrics: CRS as a Percentage of Total Inventory Quantifies the dollar value of CRS as a percentage of the total dollar value of all on-hand stock.

> CRS Reason Codes Quantifies the dollar value of DoD component CRS by CRS reason code.

### Desired Outcome for Storage and Direct Vendor Delivery

#### **Objective**

Use commercial vendors to store items that generate increased storage costs when use of those vendors represents the best value to the government.

Associated Metrics: Secondary Item Storage Costs–Distribution Depots Quantifies the aggregated cost of storing secondary item inventory in DoD distribution depots, as well as that cost as a percentage of the value of secondary item inventory.

> Secondary Item Storage Footprint Quantifies the cubic feet of storage space occupied by a DoD component's secondary item inventories.

#### **Desired Outcome for Items with No Demand**

#### **Objective**

Eliminate storage of items with a history of no demand and a low probability of future demand, unless there is an overriding reason to retain it.

Associated Metric:	Value of Inventory with 0–10+ Years of No Demand
	Quantifies the dollar value of inventories for items with zero years of no
	demand. 1 year of no demandon up to 10+ years of no demand.

### Desired Outcome for Disposition of Potential Reutilization Stock

#### **Objective**

Ensure timely disposal of PRS that the DoD components stratify as excess.

Associated Metrics: PRS Reviewed and Sent to Disposal Quantifies the dollar value of component PRS that was reviewed and sent to DLA Disposition Services for disposal. Disposal Value of Serviceable and Unserviceable Reparable and Consumable Items Quantifies the dollar value of materiel that the military services and DLA

Quantifies the dollar value of materiel that the military services and DLA send to disposal (i.e., DLA Disposition Services), broken out by serviceable reparable items, unserviceable reparable items, and consumable items.

### **Desired Outcomes for Other Inventory Improvement Actions**

#### **Objective**

Better size the DoD inventory to meet the needs of the warfighter.

Associated Metrics: AAO Stocks as a Percentage of Total Inventory Quantifies the dollar value of AAO stock as a percentage of the total dollar value of all on-hand stock.

> AAO Inventory Segmentation Quantifies the dollar value of DoD Component AAO stocks by requirement.

### **Inventory Accessibility**

### Use of Inventory Accessibility

The ability to use inventories across the DoD supply chain to fill customer demand and offset new procurements has long been a goal of DoD wholesale materiel managers. While wholesale inventories managed by the military services and DLA are already visible and accessible, not all retail inventories are visible and accessible to wholesale managers.

Inventories that are visible and accessible include service-managed unique item inventories, reparable items managed by a primary inventory control activity, DLA-managed inventories, and DLA items at service sites that are part of the DLA ISV program.

Target retail inventories that are currently not visible or accessible include common servicemanaged reparable items managed by a secondary inventory control activity, common servicemanaged consumable items, and DLA-managed consumable inventories at non-ISV sites.

To achieve the goal to use inventories across the DoD supply chain to fill customer demand and offset new procurements, a target inventory must be under an automated materiel management system that is electronically accessible to materiel managers. Those managers can then see what is in inventory and, under approved business rules, can access assets needed to fill customer demand or offset procurement actions.

This inventory accessibility metric measures the success of the Department in achieving the goal of total asset visibility and accessibility of target inventories. It can be used to identify inventories for which visibility or accessibility is targeted and the progress in achieving visibility and accessibility targets.

The charts in Figure 72 illustrate how inventory accessibility is measured.

Figure 72. Information Shown in Inventory Accessibility Graphs





### Development of Inventory Accessibility

Sub-Plan	<b>B: Total Asset Visibility:</b> Measures the percentage of inventory that is visible and accessible (if negotiated or pre-approved by the owners of the assets) to DoD organizations outside of the managing organization for the purposes of fulfilling requisitions or reducing buys.
External or Internal	Internal: Computed by the military service and DLA materiel managers.

### Description of Inventory Accessibility

Definition	The percentage of inventory dollars in component inventory management systems that other component systems can access automatically (if negotiated or pre-approved by the owners of the assets).	
Business Value	One objective of Sub-Plan B is to improve the system-wide use of inventory through increased asset visibility and the capability to use that visibility to offset the need to procure or repair additional assets. This metric measures the success of actions to provide inventory visibility and accessibility in support of that intent.	
Goals and Trend Analysis	<b>Goal:</b> Access to 90% of targeted inventory. <b>Trend:</b> Although no trend analysis is conducted, the objective is to increase inventory accessibility over time.	
Computation	The percentage of inventory dollars is computed by dividing the total inventory dollars accessible in automated component systems by the total inventory dollars.	
OSD Data Requirements	<ul> <li>Frequency: Annual data submission.</li> <li>Content: The following dollar values apply for each component (i.e., each military service and DLA):</li> <li>Accessible reparable inventory</li> <li>Accessible consumable inventory</li> <li>Inaccessible reparable inventory</li> <li>Inaccessible consumable inventory</li> </ul>	
General Display	The accessible and inaccessible percentages of total inventory are displayed. Breakdowns are available by DoD component and by consumable and reparable item. Figure 72 shows the general display for inventory accessibility.	

### **Relationships with Other Metrics**



Metrics Associated with Improving Inventory Management

Due-In Long Supply	The ability to use inventory across the supply chain to offset procurements reduces the amount of inventory purchased. It also reduces the potential purchase of DILS by reducing the size of procurements and inventory churn within the supply chain.
Excess On-Hand	Reducing DILS reduces the potential for excess inventory brought into the supply system. Inventory accessibility also reduces inventory churn by using retail excesses that create variability in demand and returns. Less churn stabilizes levels and reduces the potential for excess on-hand inventory.
Perfect Order Fulfillment	The ability to use inventory across the supply chain to fill backorders means more orders will be filled on time; thereby, increasing the number of perfect orders.

### **ERS as a Percentage of Total Inventory**

### Use of ERS as a Percentage of Total Inventory

This metric measures the value of ERS relative to total inventory. The ERS for individual items is constrained by the economic retention limit (ERL), which is the maximum level of stock that is economical to retain. ERL is not a requirement, because it is not a level of stock that is procured or has a budget set for it.

Generally, ERS results when demand declines. As inventory requirements within the AAO decline, assets previously within the AAO become ERS. If demand is increasing, the opposite occurs and ERS becomes AAO stocks.

The increases or decreases in the ERS metric should reflect changes in customer demand. ERS changes that are contrary to customer demand trends should be investigated. The notional chart in Figure 73 shows how this metric is displayed.



Figure 73. Information Shown on ERS Percentage Graph

### Development of ERS as a Percentage of Total Inventory

Sub-Plan	<b>D: Economic Retention:</b> Sizes the portion of the total inventory on-hand that is ERS.
External or Internal	<b>Internal:</b> Computed using data collected from military service and DLA materiel managers.

### Description of ERS as a Percentage of Total Inventory

Definition	The percentage of total inventory value that is ERS.
Business Value	The objective of Sub-Plan D is to review and validate component methods to establish ERLs. This metric tracks how actions in support of this objective affect the amount of ERS in DoD wholesale supply.
Goals and Trend Analysis	<b>Goal:</b> Although there is no goal for this metric, the objective is to ensure DoD economic retention is monitored relative to changes in total inventory and inventory requirements.
	<b>Trend:</b> Efforts to reduce stocks that are not economical to retain should decrease this metric; however, the metric may increase as a result of declining demand that shifts AAO stocks to ERS.
Computation	Computed as 100% times the dollar value of ERS divided by the dollar value of total inventory.
OSD Data Requirements	<b>Frequency:</b> Semi-annual submission by the military services and DLA. <b>Content:</b> Dollar value of ERS and dollar value of total secondary item inventory.
General Display	The ERS value and percentage over time, broken out by DoD component. Figure 74 shows the general display for ERS as a percentage of total inventory (then-year dollars).

Figure 74. General Display for ERS as a Percentage of Total Inventory



**ERS as a Percentage of Total Inventory** 

### **Relationships with Other Metrics**

#### Key Relationships:



Economic Benefit of ERS	The principal objective of the economic benefit metric for ERS is to identify instances where the level of ERS for an item is not economical. The response should be a reduction in ERS for those instances. That, in turn, would reduce the ERS percentage.
Value of Secondary Item Inventory	The value of secondary item inventory has a direct bearing on the ERS percentage. If the value goes up and ERS stays the same, the percentage will get smaller. If the value goes down and ERS stays the same, the percentage will get larger. Of course, increases or decreases in the ERS itself may cause the percentage to increase or decrease respectively, unless the value of inventory also changes.

### **Economic Benefit of ERS**

### Use of Economic Benefit of ERS

This metric serves two purposes. The first is to validate that the level of ERS for an item is economical. Although policy calls for the use of an economic analysis model for setting ERLs, materiel managers may add inventory to ERS using criteria outside of the economic analysis. If those inventories are not economical, they will have a benefit metric less than one. This is

particularly true for items that have no predictable (or likely) demand to support economic retention.

The second purpose of this metric is to quantify the expected savings for every expected dollar spent to retain ERS. The value of the expected savings will decrease as the level of ERS grows. Above the ERL, the savings will be less than a dollar.

The table in Figure 75 shows how economic benefit metrics are captured. The objective is to minimize the number of items and ERS dollars, where savings are less than the cost of retaining ERS (i.e., the ratio is less than 1).

Figure 75. Information Shown in ERS Economic Benefit Table	
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	Number of Items with ERS	Value of ERS	Savings to Cost Ratio
Ratio less than 1	1,161	\$446M	0.10
Ratio greater than or equal to 1	5,731	\$1,513M	9.17
Total	6,892	\$1,960M	6.21

### **Development of Economic Benefit of ERS**

Sub-Plan	<b>D: Economic Retention:</b> Quantifies the cost avoidance of retaining ERS.
External or Internal	Internal: Computed by military service and DLA materiel managers.

### **Description of Economic Benefit of ERS**

Definition	The dollar savings for every dollar spent retaining ERS.	
Business Value	<ul> <li>The objective of Sub-Plan D is to review and validate component methods to establish ERLs. This metric</li> <li>validates the economics of retaining ERS, and</li> <li>can be used to ensure the ERS for a particular item is economical.</li> </ul>	
Goals and Trend Analysis	<ul><li>Goal: Greater than or equal to 1 for all items with ERS; thereby, verifying that it is economical to retain.</li><li>Trend: The trend should be towards reducing the number of items with an ERS ratio less than 1.</li></ul>	
Computation	The metric is the quotient of the expected savings over the expected costs, where the	

Metrics Associated with Improving Inventory Management

	<ul> <li>expected savings is equal to the repurchase cost avoidance;</li> </ul>
	<ul> <li>expected costs are the sum of the storage costs, the return for disposal of unserviceable ERS, and the repair cost that would be incurred if the item were used;</li> </ul>
	<ul> <li>savings and costs are for a 10-year period;</li> </ul>
	<ul> <li>the annual storage cost is normally 1–2% of the value of the ERS being stored; and</li> </ul>
	• the current salvage value (or return from disposal) is a percentage of the value of the stock sent to disposal (that percentage is reported in the DoD SSIR).
	Frequency: Semi-annual submission by the military services and DLA.
	<b>Content:</b> The number of items, the ERS value, and the overall economic benefit for the following categories of items with ERS:
OSD Data Requirements	1. Items with a benefit equal to zero (indicating no demand to justify economic retention)
	2. Items with a benefit less than 1 (indicating some or all of the ERS is uneconomical)
	<ol> <li>Items with a benefit greater than or equal to 1</li> <li>All items with ERS.</li> </ol>
General Display	The counts and values associated with the metric are displayed in a table that shows the item counts, ERS values, repurchase cost avoidance, storage costs, disposal returns, and benefit values. Figure 75 shows the general display for the ERS economic benefit metric.

### **Relationships with Other Metrics**

Key Relationships:



ERS as a Percentage of Total Inventory	The principal objective of the economic benefit metric for ERS is to identify instances in which the level of ERS for an item is not economical. The response should be a reduction in ERS for those instances. That, in turn, would reduce the ERS percentage.
Value of Secondary Item Inventory	If the economic benefit metric for ERS causes a reduction in ERS, the value of secondary item inventory will reflect that reduction.

### **CRS as a Percentage of Total Inventory**

### Use of CRS as A Percentage of Total Inventory

The CRS as a percentage of total inventory metric measures the value of CRS relative to total inventory.

A materiel manager determines the CRS for an individual item, but CRS must conform to one of the approved reasons listed in policy. CRS is not a requirement; that is, it is not a level of stock that is procured or has a budget for it. Generally, CRS results from declining demand, which causes inventory requirements within the AAO to decline, which, in turn, causes assets previously within the AAO to become ERS or CRS. If demand is increasing, the opposite occurs, and CRS is drawn into ERS or AAO stocks.

The increases or decreases in the CRS metric should reflect changes in customer demand. CRS changes that are contrary to customer demand trends should be investigated. The notional chart in Figure 76 shows how this metric is displayed.



#### Figure 76. Information Shown in CRS Percentage Graph

### Development of CRS as a Percentage of Total Inventory

Sub-Plan	<b>E: Contingency Retention:</b> This metric sizes what portion of the total inventory on-hand is CRS.
External or Internal	<b>Internal:</b> Computed using data collected from military service and DLA materiel managers.

Metrics Associated with Improving Inventory Management

### Description of CRS as a Percentage of Total Inventory

Definition	The percentage of total inventory value that is CRS.		
Business Value	The objective of Sub-Plan E is to review and improve the justification for retaining contingency stock. This metric tracks how actions in support of this objective affect the amount of CRS in DoD wholesale supply.		
Goals and Trend Analysis	<b>Goal:</b> Although there is no goal for this metric, the desired outcome is to ensure that DoD contingency retention is monitored relative to changes in total inventory and inventory requirements.		
	<b>Trend:</b> Efforts to rid CRS of stock that is not associated with a contingency should decrease this metric, although the metric may increase because declining demand shifts AAO stocks to CRS.		
Computation	The metric is computed as 100% times the dollar value of CRS divided by the dollar value of total inventory.		
OSD Data Requirements	<b>Frequency:</b> Semi-annual submission by the military services and DLA <b>Content:</b> Dollar value of CRS and dollar value of total secondary item inventory.		
General Display	The CRS value and percentage over time with breakouts by DoD component. Figure 77 shows the general display for CRS as a percentage of total inventory (in then-year dollars).		

Figure 77. General Display for CRS as a Percentage of Total Inventory



### **CRS** as a Percentage of Total Inventory

### **Relationships with Other Metrics**

#### Key Relationships:

CBS as a Paraantage of		CRS Reason Codes
Cito as a Percentage of	<	
Total Inventory	)	Value of Secondary Item Inventory

CRS Reason Codes	The principal objective of the CRS reason codes is to ensure all CRS is supported by a contingency-related reason. The lack of a reason code may cause CRS to be reduced. That, in turn, would reduce the CRS percentage.
Value of Secondary Item Inventory	The value of secondary item inventory has a direct bearing on the CRS percentage. If the value goes up and CRS stays the same, the percentage will decrease. If the value goes down and CRS stays the same, the percentage will increase. Of course, increases or decreases in CRS may cause the percentage to increase or decrease unless the value of inventory also changes.

### **CRS Reason Codes**

### Use of the CRS Reason Codes

While the amount of CRS retained for an item is determined by its materiel manager, the rationale supporting that determination must be documented and conform to one of the approved CRS reason codes. The CRS reason code metric ensures CRS is managed and reported in accordance with those reason codes.

The six reason codes are as follows:

- 1. CRS code C: Reclamation and cannibalization.
- 2. CRS code F: Potential security assistance; foreign military sales reserve.
- 3. CRS code H: Humanitarian assistance and disaster relief, includes civil emergencies.
- 4. CRS code M: Military operational necessity.
- 5. CRS code P: Item procurement and re-procurement constrained, includes diminishing manufacturing source, life-of-type (LOT) buy, non-procurable stock, unforecastable demand, performance-based logistics items.
- 6. CRS code W: Weapon system exclusion includes weapon system modification programs, service life extension programs, and Weapon System Designator Code items.

Figure 78 shows how this metric is displayed.

Metrics Associated with Improving Inventory Management

Figure 78. Information Shown in CRS Reason Code Graph



**CRS Reason Codes** 

### Development of CRS Reason Codes

Sub-Plan	<b>E: Contingency Retention:</b> Quantifies the CRS investment by the reasons used to justify its retention.
External or Internal	Internal: Computed by military service and DLA materiel managers.

### **Description of CRS Reason Codes**

Definition	The breakdown of CRS by authorized CRS reason codes.	
Business Value	The objective of Sub-Plan E is to review and improve the justification for retaining contingency stock. This metric supports that objective by requiring components to categorize their CRS by the reason codes authorized in policy.	
Goals and Trend Analysis	<b>Goal:</b> 100% of CRS is justified by an authorized reason code. <b>Trend:</b> If 100% of CRS items are not justified, the trend is a shrinking number of items with unjustified CRS.	
Computation	The dollar values of CRS are summed by CRS reason code.	
OSD Data Requirements	<b>Frequency:</b> Semi-annual submission by military services and DLA. <b>Content:</b> The dollar value of CRS by these reason codes.	
General Display	The dollar value of CRS by reason code and DoD component. Figure 78 shows the general display for CRS reason codes.	

### **Relationships with Other Metrics**

Key Relationships:



CRS as a Percentage of Total Inventory	The principal objective of the CRS reason codes is to ensure all CRS is supported by a valid contingency retention reason. The lack of a valid retention decision that is supported by a reason code may cause CRS to be reduced. That, in turn, would reduce the CRS percentage.	
Value of Secondary Item Inventory	If the CRS decreases due to a lack of valid retention decisions, the value of secondary item inventory will reflect that reduction.	

### **Secondary Item Storage Costs-Distribution Depot**

### Use of Secondary Item Storage Costs-Distribution Depot

The secondary item storage costs-distribution depot metric tracks the costs of storing inventory within the DoD distribution depots and the cost of secondary item inventories managed by the military services and DLA.

The costs of storage (along with the costs of receiving and issuing stocks) are charged to the military services and DLA to finance the DoD distribution depot mission. Storage costs plus obsolescence costs, cost of capital, and the cost of storage losses constitute DoD's holding costs for inventory.

When combined with the acquisition value of inventory stored in a distribution depot, secondary storage costs equate to the cost to store a dollar of inventory. That cost is used in decisions that set inventory levels. Increasing costs can reduce the amount of inventory purchased and ERS.

Undervalued storage costs may threaten the financial position of distribution depots. Overvalued costs may artificially reduce inventories, resulting in less cost-effective levels.

Figure 79 shows how this metric is displayed.

Metrics Associated with Improving Inventory Management

Figure 79. Information Shown in Storage Costs Graph



Secondary Item Storage Costs

### Development of Secondary Item Storage Costs—Distribution Depot

Sub-Plan	<b>F: Storage and Direct Vendor Delivery:</b> Quantifies the annual storage costs that are incurred by the DoD distribution depots and charged to DoD component materiel managers.	
External or Internal	Internal: Computed by DLA distribution managers.	

### Description of Secondary Item Storage Costs-Distribution Depot

Definition	The costs charged to the military services and DLA for their secondary item inventory stored in DoD distribution depots.	
Business Value	The objective of Sub-Plan F is to reduce storage space and associated storage costs wherever practicable. This metric tracks the costs of storing component inventories at DoD distribution depots.	
Goals and Trend Analysis	<b>Goal:</b> Although no quantitative goal exists, the desired outcome is to lower storage costs through improved efficiency, if possible. <b>Trend:</b> As inventory goes down, storage costs should decrease, and vice versa.	
Computation	DLA computes component storage costs as the sum of open, covered, and specialized storage costs, which are based on occupied cubic feet.	
OSD Data Requirements	<b>Frequency:</b> Annually. <b>Content:</b> Total storage costs for individual military services and DLA.	
General Display	Component storage costs are displayed over time. Figure 79 shows the general display for secondary item storage costs (for distribution depots).	

### **Relationships with Other Metrics**

Key Relationships:



Secondary Item Storage Footprint	Dividing secondary item storage costs for distribution depots by the secondary item storage footprint yields the cost of storage per cubic foot.	
Value of Secondary Item Inventory	Dividing secondary item storage costs for distribution depots by the value of the secondary item inventory stored in distribution depots yields the storage cost as a percentage of inventory value.	

### **Secondary Item Storage Footprint**

### Use of Secondary Item Storage Footprint

The secondary item storage footprint metric tracks the storage footprint within the DoD distribution depots for secondary item inventories managed by the military services and DLA. It represents another way of measuring inventory growth (and decline), but it is not influenced by inflation.

When combined with storage costs, the secondary item storage footprint metric yields the cost per cubic foot of storage. Figure 80 shows how this metric is displayed.

Figure 80. Information Shown on Storage Footprint Graph



### Secondary Item Storage Footprint

Metrics Associated with Improving Inventory Management

### Development of Secondary Item Storage Footprint

Sub-Plan	<b>F: Storage and Direct Vendor Delivery:</b> Quantifies the DoD distribution depot storage footprint that is the basis for the storage costs charged to the DoD component materiel managers.	
External or Internal	Internal: Computed by DLA distribution managers.	

### Description of Secondary Item Storage Footprint

Definition	The storage footprints (given in cubic feet) of the military services and DLA for their secondary item inventory stored in DoD distribution depots.	
Business Value	The objective of Sub-Plan F is to reduce storage space and associated storage costs where practicable. This metric tracks the storage footprint of component inventories at DoD distribution depots.	
Goals and Trend Analysis	<ul> <li>Goal: Although no quantitative goal exists at this time, the desired outcome is to optimize the storage footprint relative to storage requirements to reduce storage costs.</li> <li>Trend: As inventory goes down, the storage footprint should decrease, and vice versa.</li> </ul>	
Computation	DLA calculates the storage footprint for each component in terms of millions of cubic feet.	
OSD Data Requirements	<b>Frequency:</b> Annually. <b>Content:</b> Total storage footprint for individual military services and DLA.	
General Display	Component storage footprints are displayed over time. Figure 80 shows the general display for secondary item storage footprint.	

### Relationships with Other Metrics

	Secondary Item Storage Costs -
Secondary Item Storage Footprint	Distribution Depots
	Value of Secondary Item Inventor

Secondary Item Storage Costs – Distribution Depots	Dividing secondary item storage costs for distribution depots by the secondary item storage footprint yields the cost per cubic foot of storage.	
Value of Secondary Item Inventory	The value of secondary item inventory is one way of measuring inventory growth or decline. However, the actual growth or decline may be a result of price changes. Matching changes in the value with changes in the storage footprint provides a more comprehensive picture of growth or decline.	

### Value of Inventory with 0–10+ Years of No Demand

### Use of Value of Inventory with 0–10+ Years of No Demand

This metric tracks the amount of secondary item inventory that is invested in items with years of no demand. It also shows the investment in inventory for items that were demanded within the last year.

Because inventory is generally held for sale or issue, the majority of inventory should have demands within a few years (a low number of years of no demand). If an item has had no demand in 10+ years, its stockage should be researched and be part of the metric that segments no-demand item inventory.

Figure 81 shows how this metric is displayed. Most inventory has had demand within 1 year (i.e., zero years of no demand).



*Figure 81. Information Shown on 0–10+ Years with No Demand Graph* 

### Development of Value of Inventory with 0–10+ Years of No Demand

	<b>G: Items with No Demand:</b> Quantifies the dollar amount of secondary inventory for an item that has had demand in the last year or	
Sub-Plan	<ul> <li>no demand in 1 year,</li> <li>no demand in 2 years,</li> <li>no demand in 3 years,</li> <li>no demand in 4 years,</li> <li>no demand in 5 years,</li> </ul>	<ul> <li>no demand in 6 years,</li> <li>no demand in 7 years,</li> <li>no demand in 8 years,</li> <li>no demand in 9 years, and</li> <li>no demand in 10+ years.</li> </ul>
External or Internal	Internal: Computed by the military service and DLA materiel managers.	
Metrics Associated with Improving Inventory Management

# Description of Value of Inventory with 0–10+ Years of No Demand

Definition	Display of value of inventory based on the number of years of no demand for items with inventory.	
Business Value	The objective of Sub-Plan G is to ensure items without demand in 5 or more years are not held in inventory unless there is justification. This metric shows how the inventory is distributed by years of no demand, and what portion relates to items without demand in 5 or more years.	
Goals and Trend Analysis	<b>Goal:</b> Although there is no quantitative goal for this metric, the desired outcome is to reduce the inventory held for no-demand items. <b>Trend:</b> As inventory for items with years of no demand is reduced, the	
	distribution should shift toward items with only a few years of no demand.	
Computation	The components compute the required distribution using their demand history data. Items that are new to the supply system have their years of no demand capped by the number of years they are in the supply system.	
OSD Data Requirements	Frequency: Annually.	
	<b>Content:</b> Eleven dollar values represent the 11 categories of years of no demand (i.e., 0, 1, 2, 3, 4, 5, 6, 7, 8, 9, and 10+).	
General Display	The annual distribution of inventory dollars by years of no demand is displayed. Figure 81 shows the general display for inventory dollars with $0-10+$ years of no demand.	

## **Relationships with Other Metrics**

Key Relationship:

Value of Inventory with 0–10+ Years of No Demand

Inventory Segmentation of No Demand Items	While inventory value with 0–10+ years of no demand tells us how total inventory is distributed by years of no demand, inventory segmentation of no-demand items focuses on the last six categories and how those categories are segmented into AAO, ERS, CRS, and PRS.
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# **PRS Reviewed and Sent to Disposal**

#### Use of the PRS Reviewed and Sent To Disposal

This metric quantifies the review and disposal of potential reutilization stock. By definition, PRS is excess to AAO requirements and retention levels; however, before inventory is sent to disposal, it must be reviewed to ensure it is correctly identified as excess. The results of those reviews will either categorize the inventory as either AAO or retention stock or confirm that it is excess and should go to DLA Disposition Services.

Timely reviews are necessary to keep the level of potential excess down and not waste storage costs. Just as important, the reviews need to be conducted to ensure no inventory mistakenly identified as excess is sent to disposal.

When combined with the metric on the dollar value of PRS, this metric can be used to measure the PRS review effort. If the dollar value of PRS reviewed is small compared to the level of PRS, the level of effort should be increased.

Figure 82 shows the dollar value of PRS reviewed and sent to disposal each year.





#### Development of PRS Reviewed and Sent to Disposal

Sub-Plan	<b>H: Disposition of PRS:</b> Quantifies the dollar value of PRS that was reviewed and the dollar value of reviewed PRS that was sent to disposal.	
External or Internal	Internal: Computed by military service and DLA materiel managers.	

#### Description of PRS Reviewed and Sent to Disposal

Definition	The total dollar value of PRS that is reviewed for disposal compared to the total dollar value of PRS reviewed and sent to disposal.	
Business Value	The objective of Sub-Plan H is to provide for the timely and effective review of PRS to ensure efficient disposal of excesses. This metric supports that objective by measuring the portion of PRS that is reviewed and sent to disposal.	
Goals and Trend Analysis	<b>Goal:</b> Although there is no quantitative goal for this metric, the desired outcome is for faster retention and disposal decisions and actions. <b>Trend:</b> As improvements are made to the process of identifying and reviewing PRS (e.g., reductions in data errors), the percentage of PRS sent	
	to disposal should increase.	
Computation	The DoD components compute the required dollar value based on their records of reviews and disposal actions.	

Metrics Associated with Improving Inventory Management

OSD Data	<b>Frequency:</b> Annually.
Requirements	<b>Content:</b> The annual dollar value of PRS reviewed and custody transferred to DLA for disposition.
General Display	The dollar value of PRS reviewed and transferred to disposal is displayed by year. Figure 82 shows the general display for PRS reviewed and sent to disposal.

### **Relationships with Other Metrics**

Key Relationships:



Excess On-Hand	Using excess on-hand dollars, the percentages of PRS reviewed and PRS reviewed and sent to disposal can be computed, as well as the turns for PRS.
Disposal Value of Serviceable and Unserviceable Reparable and Consumable Items	The portion of inventory sent to disposal that is not PRS reviewed can be determined by comparing the disposal value and the PRS value reviewed and sent to disposal. The portion of disposal value that is not associated with PRS review includes condemnations and retail excesses, ERS, and CRS sent directly to disposal.

# Disposal Value of Serviceable and Unserviceable Reparable and Consumable Items

# *Use of the Disposal Value of Serviceable and Unserviceable Reparable and Consumable Items Metric*

Serviceable reparable items and consumable items are disposed if they are excess to AAO requirements and retention levels. Serviceable reparable items can also be sent to disposal if the item is obsolete and has been replaced with another item, or if the item supported a weapon system that has been phased out. Unserviceable reparable items are disposed if they are condemned or if they are excess to AAO requirements and retention levels.

Although items are generally identified as PRS and then sent to DLA Disposition Services for disposal, AAO stocks and retention stocks can be sent to disposal if an AAO requirement or retention limit is reduced.

This metric captures all disposals, regardless of the reason. It can be used to determine if

- the level of the Department's investment in inventory is related to the level of inventory that is being disposed,
- consumable inventory purchases are resulting in a high level of stock that is never used, or
- more unserviceable reparable stocks are disposed than serviceable reparable stocks.

Figure 83 shows how this metric is displayed.



Figure 83. Information Shown in the Disposal Value Graph

#### Development of Disposal Value of Serviceable and Unserviceable Reparable and Consumable Items

Sub-Plan	<b>H: Disposition of PRS:</b> Quantifies the dollar values of different types and conditions of items sent to disposal.
External or Internal	Internal: Computed by military service and DLA materiel managers.

#### Description of Disposal Value of Serviceable and Unserviceable Reparable and Consumable Items

Definition	<ul> <li>Inventory value sent to disposal that are</li> <li>serviceable reparable assets,</li> <li>unserviceable or condemned reparable assets (indicating at least one use), or</li> <li>consumable assets.</li> </ul>	
Business Value	The objective of Sub-Plan H is to provide for the timely and effective review of PRS to ensure efficient disposal of excesses. This metric provides insight into what is being sent to DLA Disposition Services for disposal.	
Goals and Trend Analysis	<b>Goal:</b> There are no quantitative goals for this metric. <b>Trend:</b> Current values are combined with historical values to identify any anomalies or trends.	
Computation	The components compute the three required dollar values based on their records of reviews and disposal actions.	

Metrics Associated with Improving Inventory Management

	Frequency: Annually.
OSD Data Requirements	<b>Content:</b> Consumable item, serviceable reparable item, unserviceable or condemned reparable item inventories that are sent to disposal.
General Display	The dollar values of the three categories of inventory sent to disposal are displayed by year, along with the percentage of reparable item inventory sent to disposal. Figure 83 shows the general display for disposal value for serviceable and unserviceable reparable and consumable items.

#### **Relationships with Other Metrics**

#### Key Relationship:

Disposal Value of Serviceable and Unserviceable		PRS Reviewed and
Reparable and Consumable Items	ſ	Sent to Disposal

PRS Reviewed and Sent to Disposal	The portion of inventory sent to disposal that is not PRS reviewed can be determined by comparing the disposal value and the value for PRS reviewed and sent to disposal. The portion of disposal value that is not associated with PRS review includes condemnations and retail excesses, ERS, and CRS sent directly to disposal.
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# AAO Stocks as a Percentage of Total Inventory

#### Use of AAO Stocks as a Percentage of Total Inventory

The AAO stocks as a percentage of total inventory metric measures the value of AAO stock relative to total inventory. The requirements within the AAO are both demand- and non-demand-based. To the extent that demand-based requirements influence the overall AAO, increases and decreases in customer demand should be reflected in increases and decreases in AAO stock.

The notional chart in Figure 84 shows how this metric is displayed.



#### Figure 84. Information Shown in AAO Percentage Graph

# Development of AAO Stocks as a Percentage of Total Inventory

Sub-Plan	<b>I: Other Inventory Improvement Actions:</b> Sizes the portion of the total inventory on-hand that is within the AAO.
External or Internal	<b>Internal:</b> Computed using data collected from military service and DLA materiel managers.

# Description of AAO Stocks as a Percentage of Total Inventory

Definition	The percentage of total inventory dollars that are within the AAO.
Business Value	The objective of Sub-Plan I is to make improvements to inventory management not specifically stated in Section 328 of the 2010 National Defense Authorization Act. Efforts to improve demand forecasting and requirements setting for non-forecastable items are two examples of improvements. The effect of such improvement efforts on the DoD inventory investment should be captured in this metric.
Goals and Trend Analysis	<b>Goal:</b> There is no goal for this metric. <b>Trend:</b> Efforts to right-size AAO requirements to effectively meet customer wartime and peacetime requirements should affect this metric, along with changes in customer demand.
Computation	Computed as 100% times the dollar value of AAO stocks divided by the dollar value of total inventory.
OSD Data Requirements	<b>Frequency:</b> Semi-annual submission by military services and DLA. <b>Content:</b> Dollar value of AAO stocks and dollar value of total secondary item inventory.
General Display	The AAO percentage over time, with breakouts by DoD component. Figure 85 the general display for AAO stocks as a percentage of total inventory.

Metrics Associated with Improving Inventory Management

AAO Stocks as a Percentage of Total Inventory \$100 90% 75% \$80 60% In **Billions** \$60 45% \$40 30% \$20 15% \$0 0% March March March FY2009 FY2010 FY2011 FY2012 FY2013 FY12 FY13 FY14 **Total Inventory Dollars** \$94.5 \$101.4 \$102.5 \$104.6 \$96.4 \$96.6 \$98.8 \$98.9 AAO \$65.9 \$72.6 \$73.9 \$74.1 \$69.2 \$71.6 \$74.3 \$74.4 ----- Percent AAO 70% 72% 72% 71% 72% 74% 75% 75%

Figure 85. General Display for AAO Stocks as a Percentage of Inventory

# Relationships with Other Metrics

Key Relationships:



AAO Inventory Segmentation	The principal objective of the AAO inventory segmentation is to break AAO stocks out according to the requirements they support. While the percentage metric sizes AAO stocks, the segmentation metric drills down to the content of the AAO for items or groups of items.
Value of Secondary Item Inventory	The value of secondary item inventory has a direct bearing on the AAO percentage. If the value of secondary item inventory goes up and AAO stock stays the same, the percentage will get smaller. If the value goes down and AAO stock stays the same, the percentage will get larger. Of course, increases or decrease in the AAO stock may cause the percentage to increase or decrease, unless the value of inventory also changes.

# **AAO Inventory Segmentation**

#### **Use of AAO Inventory Segmentation**

The AAO stock for an individual item is the sum of the assets against the requirements that are applicable to that item. Some components consider AAO to be synonymous to the budget horizon; that is, when assets are applied against the requirements within the AAO, the results are the current deficits that need to be included when preparing their WCF budget. (Note that stock levels above AAO are not part of their budgets.)

The applicability of each AAO requirement is as follows:

- War reserves only apply to items that require additional stock to transition from peacetime to wartime operating levels and to support initial theater opening.
- Only items stocked at retail supply activities should have retail requisitioning objectives.
- Only items with backorders should have stock due-outs.
- The requirement for a non-forecastable item falls into one of four requirements:
  - Insurance stockage (stockage of a minimum replacement unit to guard against unpredictable, but catastrophic demand)
  - Numeric stockage (stockage of up to two minimum replacement units for items with insufficient demand to use a forecasting model)
  - Limited demand stockage (max./min. stockage for items with intermittent demand that does not provide the basis for a creditable forecast from a statistical model)
  - High demand variation stockage (max/min stockage for items with demand that is too variable to provide the basis for a creditable forecast from a statistical model).
- A forecastable item has the following requirements:
  - Safety level
  - Repair cycle level (for reparable items only, forecasted demand over the item's repair cycle time)
  - PLT level (forecasted demand over the item's PLT)
  - ALT level (forecasted demand over the item's ALT)
  - Procurement cycle or economic order quantity (amount or quantity to be routinely procured).
- Although the provisioning of stocks in support of a weapon system are captured in the above requirements, any weapon system support stock not captured in provisioning requirements should be reported as weapon system program stock.
- Items whose inventory is owned by the government but are managed by a contractor should be reported as contractor-managed inventory.
- LOT buy quantities fall within the AAO, but only apply to on-order stock.

Metrics Associated with Improving Inventory Management

The breakout of AAO stocks provides a full profile of inventory that is held for wartime and peacetime requirements. It also segments AAO stocks into those stocks associated with forecastable items and those stocks associated with non-forecastable items. For forecastable items, forecast accuracy and bias provide some measure of the probable use of their segments.

Figure 86 shows how this metric is displayed.

#### Figure 86. Information Shown in AAO Segmentation Graph

#### **AAO Inventory Segmentation**

\$16,000.0 \$14,000.0 \$12,000.0 \$10,000.0 \$6,000.0 \$4,000.0 \$2,000.0		1					_	_	_					l
ŞU.U	War Reserves	Retail Requisitioning Objective	Due Outs	Demand Requirement	Insurance	Numeric Stockage	Limited- Demand Stockage	High Demand Variation Stockage	Safety Levels	Repair Cycle Level	Procurement Lead Time Level	Economic Order Quantity	LOT/DMSMS	Contractor Managed Inventory
Army	\$1,074.0	\$2,028.0	\$319.0	\$7,914.0	\$-	\$9.6	\$-	\$-	\$184.0	\$312.0	\$683.2	\$89.0	\$1,988.1	\$-
Dept of the Navy	\$22.4	\$7,695.7	\$654.3	\$6,994.1	\$176.7	\$-	\$-	\$-	\$156.9	\$377.5	\$197.5	\$422.3	\$45.4	\$4,052.5
Air Force	\$4,142.2	\$1,477.9	\$93.6	\$13,500.0	\$28.8	\$808.6	\$-	\$-	\$453.7	\$138.5	\$191.8	\$-	\$0.4	\$9,867.3
DLA	\$87.9	\$-	\$118.0	\$1,671.7	\$-	\$1,000.9	\$1,076.0	\$1,012.9	\$1,027.9	\$-	\$1,630.7	\$565.3	\$97.4	S-

# **Development of AAO Inventory Segmentation**

Sub-Plan	<b>I: Other Inventory Improvement Actions:</b> Quantifies the inventory investment in each of the authorized AAO levels.			
External or Internal	Internal: Computed by military service and DLA materiel managers.			

#### **Description of AAO Inventory Segmentation**

Definition	The breakdown of AAO stocks by authorized requirements.			
Business Value	The objective of Sub-Plan I is to make other improvements to inventory management not specifically stated in Section 328 of the 2010 National Defense Authorization Act. Efforts to improve demand forecasting and improve requirements setting for non-forecastable items are two examples of those improvements. The effect of such improvement efforts on specific AAO requirements should be captured in this metric.			
Goals and Trend Analysis	<ul><li>Goal: 100% of stock portrayed as AAO stock accurately assigned to an authorized AAO requirement.</li><li>Trend: Requirements based on demand forecasts should trend in the same</li></ul>			
	direction as demand is trending.			
Computation	The dollar values of AAO stocks are summed by authorized requirements.			

	<b>Frequency:</b> Semi-annual submission by the military services and DLA.					
OSD Data Requirements	<b>Content:</b> The dollar value of AAO stocks by these requirements:					
	War reserves					
	Retail requisitioning objective					
	Stock due out					
	• Demand					
	Insurance stockage					
	Numeric stockage					
	Limited demand stockage					
	High demand variation stockage					
	Safety level					
	Repair cycle level					
	• PLT level					
	ALT level					
	<ul> <li>Procurement cycle/economic order quantity</li> </ul>					
	Weapon system program stock					
	Contractor-managed stock level.					
General Display	The dollar value of AAO stock by requirement and DoD component. Figure 86 shows the general display for AAO inventory segmentation.					

# **Relationships with Other Metrics**

#### Key Relationships:

AAO Inventory Segmentation		Demand Forecast Accuracy and Bias
	(	Procurement Lead Time Variance

Demand Forecast Accuracy and Bias	Knowing demand forecast accuracy and bias provides a quantitative means for judging the accuracy of AAO levels associated with forecastable items.
Procurement Lead Time Variance	Knowing procurement lead time variances for production and ALTs provides a quantitative means for judging the accuracy of AAO lead time requirements levels.

This section of the DoD Supply Chain Metrics Guide contains detailed information on distribution management functional metrics. That information includes e comprehensive description of each metric and instructions on how the metric is measured and how it should be used. Charts showing measurements over time are included to help interpret the performance of each metric. Several of the distribution metrics resemble established enterprise metrics or inventory management metrics. While similar, these metrics are not identical because they are centered on DLA-managed items, which account for the bulk of materiel shipments within the DoD supply chain.

As noted earlier, the success of inventory management improvement efforts cannot be determined by a single metric. The same is true in measuring the success of distribution management improvement efforts.

A comprehensive assessment of DoD distribution management performance requires a review of all of the enterprise level metrics and the distribution management functional metrics in this Guide and their interrelationships. In some cases, performance cannot be determined by looking at the metric itself; it must be assessed in concert with the performance of other related metrics. In such cases, the related metrics are provided for review in conjunction with the targeted metric.

# **DLA Logistics Response Time**

#### Use of the DLA Logistics Response Time

The DLA LRT metric evaluates the time requisitioners must wait to receive their requisitioned DLA materiel. LRT includes the supply chain's response time for customer orders not filled at the retail level. It is also the order and shipping time for requisitions replenishing retail inventory levels.

LRT includes backorder time, which is not evaluated in the TDD compliance metric. It also includes all orders (except for initial outfitting orders) placed on the wholesale echelon of supply managed by DLA. DLA LRT is identical to the enterprise level LRT metric except for the following differences:

- It is limited to DLA-managed Class IX supply class (i.e., spares and repair parts) items that support weapon system maintenance. DLA accounts for approximately 86% of all requisitions for Class IX items.
- Its display focuses on CONUS and OCONUS LRT for military service customers by issue priority group.

This view of LRT is geared to identify at a macro level potential distribution issues in supporting wholesale customer demand.

The notional graphs in Figure 87 illustrate the general conclusions that can be made from plotting DLA LRT over time. Increasing times are negative, in that they show greater delays in providing requisitioned DLA-managed materiel. Decreasing times are positive, in that they show shrinking delays. One-time spikes or jumps in times are negative anomalies that should be researched to identify their cause.



Figure 87. Assessment from DLA Logistics Response Time Graph

# Development of DLA Logistics Response Time

Attribute	<b>Responsiveness:</b> Timely receipt of materiel demanded from wholesale sources of supply to retail activities and end-use customers is a key measure of the DoD supply chain performance.
External or Internal	<b>Internal:</b> Limited to demand placed on DLA; as such, it is a sub-metric to overall LRT.

# Description of DLA Logistics Response Time

Definition	A measurement of the total elapsed time (in days) from customer requisition to receipt of materiel ordered from a DoD organic or commercial source of supply.			
Business Value	This metric indicates how timely the wholesale echelon of supply and distribution system is responding to customers, the largest customer segment being retail activities. DLA LRT also links DoD supply chain performance to negotiated standards for responsiveness (e.g., TDD standards).			
Goals and Trend Analysis	<b>Goal:</b> Similar to the goal for LRT for all sources of supply, the goal for DLA LRT is to meet TDD standards. An objective of distribution effectiveness for the Department is to maintain or improve DLA LRT.			
	<b>Trend:</b> Current values are combined with historical values to identify any anomalies or trends. An upward trend indicates increasingly negative performance while a downward trend implies improving performance.			
Computation	The measurement of DLA LRT is from the date the retail supply activity requisition is submitted to DLA until the date the requisitioned materiel is received and posted in the requisitioner's materiel management system. Data is filtered down to DLA-sourced Class IX goods, and then sorted by service and issue priority group (IPG). In addition, planned and unplanned direct vendor deliveries and other issues not identified as immediate issues or backorders are filtered out.			
OSD Data Requirements	DLA Transaction Services submits LMARS records to ODASD(SCI) on a monthly basis.			
General Display	Current display shows total pipeline times and CONUS segment times by source of supply, geographic COCOM, and myriad other options. Figure 88 shows the general display for DLA LRT.			



Figure 88. General Display for DLA Logistics Response Time

#### **Relationships with Other Metrics**



Logistics Response Time	DLA LRT is a subset of overall LRT. Because DLA is the primary contributor to overall LRT, DLA LRT drives overall LRT.			
DLA Wholesale Supply Availability	DLA wholesale supply availability measures the effectiveness of DLA in filling all requisitions it measures. As DLA wholesale supply availability increases, DLA LRT should go down, because more requisitions are filled immediately with off-the-shelf stocks (i.e., fewer backorders and less backorder time)			
DLA Backorders to the Services	DLA backorders drive DLA supply availability, and backorder time adds to the response time of the supply chain.			

Perfect Order Fulfillment (for Demands Placed on DLA)	POF for demands placed on DLA measures the reliability of the DoD supply chain with regard to DLA-managed materiel. In addition to the focus on the right quantity, right condition, and right quality, it considers the "right time" by determining if the requisition's LRT meets the appropriate TDD standard.
Customer Wait Time (for Items Managed by DLA)	CWT for DLA-managed items measures the overall speed of the DoD supply chain in responding to orders measured by DLA that are associated with weapon system maintenance; it includes DLA LRT for end-use requisitions. It also depends on the timely fulfillment of resupply requisitions as measured by LRT. CWT is also being evaluated for DLA support to the services' maintenance depots.
TDD Compliance (for Demands Placed on DLA)	TDD compliance for demands received by DLA determines if the times for requisitions being fulfilled through the DoD supply chain are meeting TDD standards. In this case, those times are LRTs (minus backorder times) for requisitions received by DLA.

# **DLA Wholesale Supply Availability**

## Use of the DLA Wholesale Supply Availability

The DLA wholesale supply availability metric evaluates the range and depth of rules set forth by DoD wholesale materiel managers (i.e., are they stocking the right items in the right quantities?).

If stock is not readily available to fill the quantity of a customer requisition, the requisition is backordered. A backorder—whether filled by an incoming procurement, an unplanned DVD, or a lateral distribution action—reduces service to the customer by adding time to fulfill those actions. On the other hand, if stock is on the shelf to fill the demand, then no time on backorder is added to the demand's LRT.

For an individual requisition, either sufficient stock is on the shelf to fill the demand or there is insufficient stock on the shelf to fill all or part of the order quantity. Because wholesale supply availability is an aggregate across all requisitions, it is a percentage between 0% (all requisitions are backordered) and 100% (no requisitions are backordered).

This metric is identical to the enterprise level wholesale supply availability metric except for the following differences:

- It is limited to DLA-managed Class IX supply class (i.e., spares and repair parts) items that support weapon system maintenance. DLA accounts for approximately 86% of all requisitions for Class IX items.
- Its display focuses on CONUS and OCONUS LRT for military service customers by issue priority group.

This view of wholesale supply availability when combined with DLA LRT is geared to identify at a macro level potential distribution issues in supporting wholesale customer demand.

Figure 89 shows how the metric is displayed.



DLA Wholesale Supply Availability

Figure 89. Information Shown in DLA Supply Availability Graph

## Development of DLA Wholesale Supply Availability

Attribute	<b>Reliability:</b> The percentage of time a requisition is not on backorder is a measure of the supply system's ability to fulfill customer orders.
External or Internal	<b>Internal:</b> This metric is limited to demand received by DLA; as such, it is a sub-metric to overall wholesale supply availability and pertains only to DLA-managed consumable Class IX materiel.

## Description of DLA Wholesale Supply Availability

Definition	The percentage of demands placed on the wholesale echelon of supply that are not backordered, excluding future material obligations. Secondary item supply availability is synonymous with supply materiel availability and material availability.
Business Value	<ul> <li>Serves as an indicator of the ability of the wholesale inventory management to plan and execute in a synchronous manner.</li> <li>Reflects the ability of wholesale materiel managers to respond to changes in customer demand and funding.</li> </ul>
Goals and Trend Analysis	<b>Goal:</b> DLA goals for this metric are in their performance-based agreements with customers.
	<b>Trend:</b> Current values are combined with historical values to identify any anomalies or trends. An upward trend is positive, while a downward trend is negative.
Computation	DLA identifies backorders as requisitions with an initial BB status (item is back ordered against a stock due-in). Data is filtered down to DLA-sourced Class IX goods, sorted by service and IPG.

OSD Data	<b>Frequency:</b> Monthly.
Requirements	<b>Content:</b> Availability measurements from the DLA Fusion Center.
General Display	Supply Chain Metrics Center currently shows supply availability, number of total demands, and the number of backordered demands. Figure 90 shows the general display for DLA supply availability.

**DLA Supply Availability** 100% 300,000 90% 250,000 80% 70% 200,000 60% 50% 150,000 40% 100,000 30% 20% 50,000 10% 0% 0 Oct-12 Jan-13 Apr-13 Jul-13 Oct-13 Jan-14 Apr-14 Jul-14 Oct-14 Oct-11 Jan-12 Apr-12 Jul-12 Total Orders FY12 Baseline (IPG 1) -IPG1 -IPG2 -IPG3 _ _ .

#### Figure 90. General Display for DLA Supply Availability

#### **Relationships with Other Metrics**

#### Key Relationships:



Wholesale Supply Availability	DLA supply availability is a subset of overall DoD wholesale supply availability. Moreover, because DLA has more demands than other DoD wholesalers, its availability drives overall availability.
Procurement Lead	Procurement lead time variance reflects if suppliers are delivering materiel
Time Variance (for	to DLA as predicted. If the variance indicates a high number of late
DLA-Managed	deliveries, backordered demands could increase. If the variance indicates a
Items)	high number of early deliveries, backordered demands could decrease.

Value of Secondary Item Inventory (for DLA-Managed Items)	A demand is not backordered if there is stock on-hand to fill the demand quantity. If the value of DLA inventory increases in constant dollars while DLA demand is level, then more stock is available to fill demand and avoid backorders. The same is true if DLA demand decreases and DLA inventory remains stable.
Demand Forecast Accuracy and Bias (for DLA-Managed Items)	The demand forecast accuracy and bias metric shows the ability of DLA to predict the needs of its customers and whether DLA is over- or under- forecasting customer requirements. If DLA is over-forecasting, inventory requirements levels should cover a larger portion of customer demand than expected, thereby contributing to a higher wholesale supply availability; however, if DLA is under-forecasting customer requirements, inventory requirements levels should cover a smaller portion of customer demand than expected, thereby contributing to a lower wholesale supply availability.

# **DLA Backorders to Services**

# Use of the DLA Backorders to Services

The DLA backorders to the services metric measures the number of orders in a backorder status by month, regardless of the length of time spent on backorder. Similar to DLA wholesale supply availability, it measures DLA's ability to fill orders from within its supply network. Reported by service, it includes all orders for DLA-managed materiel; but for DLA distribution effectiveness purposes, it is limited to the hardware supply chain and is broken out by IPG.

This metric can have a large effect on LRT, because filling backordered requisitions often takes significantly longer than filling orders immediately. As the number of backorders decreases and there are less backordered requisitions with longer times, overall logistics response times will decrease.

Figure 91 shows how the metric is displayed. An objective of distribution effectiveness for the Department is to reduce the number of backorders below the FY2012 baseline.

Figure 91. Information Shown in DLA Backorders Graph



#### **Backorders Across Services**

#### **Development of DLA Backorders to Services**

Attribute	<b>Reliability:</b> Backorders are a count of the number of requisitions that are assigned a BB status, indicating that requisitioned materiel cannot be issued due to a stock shortfall.
External or Internal	Internal: DLA tracks its backorders or unfilled orders.

# Description of DLA Backorders to Services

Definition	The numbers of wholesale backorders at the end of the reporting period, where a wholesale backorder is the unfulfilled portion of a requisition (for a stocked or a non-stocked item) that is not immediately available for issue, but is recorded as a commitment for issue upon receipt of assets from procurement. Backorder is synonymous with unfilled order or unfulfilled customer materiel obligation.
Business Value	Tracking the numbers of backorders over time provides an indication of how reliable wholesale managers are in satisfying the needs of their customers.
Goals and Trend Analysis	<b>Goals:</b> Maintain or improve performance. <b>Trend:</b> A downward trend in the number of backorders is positive, while an upward trend is negative.
Computation	Count backorders in accordance with DLM 4000.25-1 (MILSTRIP) rules: backorders are requisitions with a current status code of BB, BC, BD, BF, BZ, or BV (definitions for backorder status codes can be found on page 55). Planned direct vendor deliveries have a status code of BV, but are not backorders. Data is filtered by service and IPG level. Data is pulled from the

OSD Data	<b>Frequency:</b> Monthly.
Requirements	<b>Content:</b> The number of backorders on hand at the end of the month from the DLA Fusion Center.
General Display	Backorders counts by sources of supply (i.e., ICPs for the Service and supply chains for DLA). Figure 92 shows the general display for DLA backorders.

Figure 92. General Display for DLA Backorders



# **DLA Backorders to Services**

#### **Relationships with Other Metrics**

Key Relationships:



DLA Wholesale Supply Availability	Supply availability measures the percentage of demands that are not backordered. Therefore, the number of backorders is directly related to supply availability. If the number of backorders increases while demand and time on backorder are stable, supply availability will decrease. Likewise, if demand and time on backorder are stable and the number of backorders decreases, supply availability will increase.
DLA Logistics Response Time	If a requisition placed on DLA is backordered, the time to respond to the customer is lengthened. The actual extended time is the backorder time, which will vary depending on the replenishment of inventory levels or the emergence of excesses in the system that would be available to DLA for filling backorders.

# **Net Effectiveness**

### Use of the Net Effectiveness

The net effectiveness metric is the percentage of orders from mapped/default customers that a depot is able to fill. It considers only orders for items on the depot's planned stocking list. It is a measure of each depot's (and the network as a whole) ability to fill orders that the network expects the depot to fill.

It is important to look at this metric from a CONUS and an OCONUS perspective separately, because DLA uses different stocking strategies for CONUS and OCONUS depots. SKU is a term used to refer to the identification of an item stored in inventory. The ESB is a DLA initiative to store the items it manages in the most economical number of CONUS distribution depots. The economic movement quantity (EMQ) is a DLA initiative to move materiel to overseas depots in the most economical manner. ESB is the main driver of net effectiveness changes in CONUS, while EMQ is the main driver of net effectiveness of the metric is also reported with military service breakouts, to highlight the various impacts of DLAs stocking strategies on the military services.

Figure 93 shows how the net effectiveness metric is displayed as part of DLA distribution effectiveness. The ESB reassigned planned depot stock, which, in turn, reduced net effectiveness; however, the effectiveness percentage is increasing as stocks "attrite" out of depots that are not designated for stockage under ESB. Increasing net effectiveness should reduce distribution costs.



#### Net Effectiveness Across Services

Figure 93. Information Shown in Net Effectiveness Graph

#### Development of Net Effectiveness

	Planning & Precision: Distribution planning involves the mapping of
Attribute	customers to depots and the planning for placement of stock into depots.
	This metric quantifies the effectiveness of those efforts.

# Description of Net Effectiveness

Definition	The percentage of orders filled based on depot mapping and the plan to stock materiel at each depot. An order counts toward net effectiveness if it is issued from the depot the customer is mapped to and where DLA plans to have stock. If DLA does not plan to stock the ordered materiel at the depot, it does not count toward net effectiveness. If DLA does not map the issuing depot to the customer, it does not count towards net effectiveness.
Business Value	<ul> <li>Serves as an indicator of the levels of service from a designated distribution depot to customer, based on the plan to stock items.</li> <li>Only includes incoming requisitions for DLA materiel that is carried in stock.</li> </ul>
Goals and Trend Analysis	<b>Goals:</b> Monitor for return to FY2012 baseline for CONUS. Maintain or improve for OCONUS. <b>Trend:</b> An upward trend is positive, while a downward trend is negative.
Computation	Data includes the percentage of orders filled at a particular DLA depot by military service based on what the depot planned to stock. Data is processed and calculated by DORRA analysts.
OSD Data Requirements	Frequency: Monthly. Content: Compiled by DLA.
General Display	Data includes net effectiveness for all DLA depots included in the distribution effectiveness analysis. Figure 93 shows the general display for net effectiveness.

# **Relationships with Other Metrics**



	Distribution planning effectiveness is a group label applied to net
<b>Distribution Planning</b>	effectiveness, attrition net effectiveness, and gross effectiveness, which are
Effectiveness	all measures of distribution planning. They differ in the treatment of
	depot mapping to customers and the treatment of stock positioning.

DLA Logistics Response Time	The time to deliver requisitioned materiel to a customer is a function of the mode of shipping as well as the distance between the customer and the depot where the materiel is stocked. Distribution planning affects the distance between customer and depot.
Perfect Order Fulfillment (for Demands Placed on DLA)	The on-time portion of POF is driven by LRT. If the time is within the TDD standard, the shipment is on-time. Because distribution planning affects the time to delivery, it also affects POF.

# **Attrition Net Effectiveness**

#### Use of the Attrition Net Effectiveness

The primary use of the attrition net effectiveness metric is to act as a control for the effects of ESB implementation on DLA depot networks in CONUS.

The CONUS implementation of ESB resulted in large amounts of materiel being located at depots that no longer had active SKUs for that materiel. The decision was made to "attrite" this materiel in place; if a requisition is placed for an item, and the active SKU location had dropped below its reorder point for that item, the order goes to any other CONUS location to be filled before a purchase request is initiated. The result is a dip in net effectiveness across all CONUS locations, while orders are filled by non-SKU build locations.

Attrition net effectiveness considers a success to be a fill by either the location that has an active SKU for that item (following ESB) or by a depot that has an SKU for the ordered item (before ESB). It will continue to be reported until the materiel without active SKUs following ESB implementation has been depleted and net effectiveness returns and stabilizes near FY2012 levels.

Figure 94 shows how the metric is displayed as part of DLA distribution effectiveness. Attrition net effectiveness is net effectiveness with effects of ESB removed.





#### **Attrition Net Effectiveness Across Services**

# Development of Attrition Net Effectiveness

Attribute	<b>Planning &amp; Precision:</b> Distribution planning involves the mapping of customers to depots and the planning for placement of stock into depots. This metric shows the effectiveness of those efforts.
External or Internal	<b>Internal:</b> This metric is based on issue data collected from the DoD supply chain.

## **Description of Attrition Net Effectiveness**

Definition	The percentage of orders filled by either the mapped or ESB depot.
Business Value	<ul> <li>Attrition net effectiveness</li> <li>indicates the levels of customer service from the designated distribution depot on planned stock items, while controlling for ESB;</li> <li>takes into account ESB correct fill, as well as any fill that came from the original depot; and</li> <li>does not penalize DLA for change in stocking or mapping.</li> </ul>
Goals and Trend Analysis	<b>Goals:</b> Eliminate from reporting when net effectiveness (CONUS) returns near FY2012 baseline levels.
Computation	Data includes percentage of orders filled by depot and service based on ESB stocking logic, as well as previous stocking logic. Data is processed and calculated by DORRA analysts.
OSD Data Requirements	<b>Frequency:</b> Monthly. <b>Content:</b> Compiled by DLA.
General Display	Data includes attrition net effectiveness for all military services and mapped depots. Figure 94 shows the general display for attrition net effectiveness.

#### **Relationships with Other Metrics**

#### Key Relationships:



Distribution Planning Effectiveness	Distribution planning effectiveness is a group label applied to net effectiveness, attrition net effectiveness, and gross effectiveness, which are all measures of distribution planning. They differ in the treatment of depot mapping to customers and the treatment of stock positioning.
DLA Logistics Response Time	The time to deliver requisitioned materiel to a customer is a function of the mode of shipping as well as the distance between the customer and the

	depot where the materiel is stocked. Distribution planning affects the distance between customer and depot.
Perfect Order Fulfillment (for Demands Placed on DLA)	The on-time portion of POF is driven by LRT. If the time is within the TDD standard, the shipment is on-time. Because distribution planning affects the time to delivery, it also affects POF.

# **Gross Effectiveness**

#### Use of the Gross Effectiveness

This metric is a measure of the OCONUS depots' ability to fill orders from their mapped customers. This metric does not take planned stocking lists into account; all requests for materiel are mapped to customers. Because it does not take active SKUs into account, it is often lower than other effectiveness metrics, but it is important to measure DLAs fill rates at its forward stocking locations.

Figure 95 shows how the metric is displayed as part of DLA distribution effectiveness.

Figure 95. Information Shown in Gross Effectiveness Graph



#### **Gross Effectiveness Across Services**

#### **Development of Gross Effectiveness**

Attribute	<b>Planning &amp; Precision:</b> Distribution planning involves the mapping of customers to depots and the planning for placement of stock into depots. This metric shows the effectiveness of those efforts.
External or Internal	<b>Internal:</b> This metric is based on issue data collected from the DoD supply chain.

#### **Description of Gross Effectiveness**

Definition	The percentage of orders filled by mapped OCONUS depots, regardless of what those depots planned to stock.
Business Value	Gross effectiveness

	• indicates the levels of service from a distribution depot to a customer on all items requested by the customer,
	<ul> <li>informs better stock positioning logic, and</li> </ul>
	<ul> <li>includes all incoming requisitions for both carried and not carried materiel.</li> </ul>
Goals and Trend Analysis	Goals: Maintain or improve performance.
Computation	Data includes percentage of orders filled at a particular DLA OCONUS depot by military service. Data is processed and calculated by DORRA analysts.
OSD Data	Frequency: Monthly.
Requirements	<b>Content:</b> Compiled by DLA.
General Display	Data includes gross effectiveness for all OCONUS depots included in the DLA Distribution Effectiveness Model. Figure 95 shows the general display for gross effectiveness.

#### **Relationships with Other Metrics**

#### Key Relationships:



Distribution Planning Effectiveness	Distribution planning effectiveness is a group label applied to net effectiveness, attrition net effectiveness, and gross effectiveness, which are all measures of distribution planning. They differ in the treatment of depot mapping to customers and the treatment of stock positioning.
DLA Logistics Response Time	The time to deliver requisitioned materiel to a customer is a function of the mode of shipping as well as the distance between the customer and the depot where the materiel is stocked. Distribution planning affects the distance between customer and depot.
Perfect Order Fulfillment (for Demands Placed on DLA)	The on-time portion of POF is driven by LRT. If the time is within the TDD standard, the shipment is on-time. Because distribution planning affects the time to delivery, it also affects POF.

# Lateral Redistribution

#### Use of Lateral Redistribution

The lateral redistribution metric is a measure of the dollar value of backorders filled by lateral redistribution. As such, it is a measure of success for the DLA ISV initiative.

Figure 96 shows how the monthly and annual dollar value of backorders filled through ISV are displayed. Because lateral redistribution is a function of the available amount of retail stock 152

surplus to requirements, it can increase if surplus stocks increase, or it can decline if those surplus stocks decline.



#### Figure 96. Information Shown in Lateral Redistribution Graph

#### **Development of Lateral Redistribution**

Attribute	<b>Cost and Responsiveness:</b> Effective use of retail stock surplus to requirements can decrease DLA inventory costs, while providing more responsiveness support to customers.
External or Internal	Internal: The value of ISV-filled backorders is captured by DLA.

#### **Description of Lateral Redistribution**

Definition	The dollar value of service-owned excess materiel redistributed to DLA to fill materiel requests or requisitions and prevent backorders.
Business Value	Lateral redistribution offers a cost-effective reutilization of DLA-managed but service-owned excess consumable inventories to reduce backorders.
Goals and Objective	The ongoing goal of ISV is to reduce backorders by cost-effectively reutilizing and redistributing service-owned consumable excess materiel to fill DLA material requests or requisitions.
Computation	Data is pulled from the DLA Total Asset Visibility system.
OSD Data Requirements	<b>Frequency:</b> Monthly. <b>Content:</b> Compiled by DLA.

#### General Display

Dollars reported by month and year. Figure 96 shows the general display for lateral redistribution.

#### **Relationships with Other Metrics**

**Key Relationships:** 

	Logistics Response Time
Lateral Redistribution	
	DLA Backorders to Services

Logistics Response Time	Lateral redistribution fills outstanding backorders and, consequently, reduces the LRT for those backorders.	
DLA Backorders to Services	Lateral redistribution reduces the number of outstanding backorders.	

# **Procurement Offset**

#### **Use of Procurement Offset**

The procurement offset metric is another ISV measure of success. It measures the dollar value of retail excesses that are used to offset wholesale procurements.

Figure 97 shows how the metric is displayed. The chart shows how offsets increased when the Air Force joined the ISV program. Because procurement offsets are a function of the available amount of retail stock surplus to requirements, it can increase if those surplus stocks increase or it can decline if those surplus stocks decline.





# Development of Procurement Offset

Attribute	<b>Cost and Responsiveness:</b> Effective use of retail stocks surplus to requirements can decrease DLA procurement costs.			
External or Internal	Internal: The value of ISV-sourced procurement offsets is captured by DLA.			

# Description of Procurement Offset

Definition	The dollar value of assets that have been procured by DLA from one of the military services to fill a planned buy (in lieu of a contract with a vendor).		
Business Value	Procurement offsets provide a cost-effective re-utilization of service-owned material to fill DLA planned buys and prevent new contracts.		
Goals and Objective	An ongoing goal of ISV is to offset DLA procurements and prevent new contracts, while reducing service-owned excess.		
Computation	Data is pulled from the DLA Total Asset Visibility system.		
OSD Data Requirements	<b>Frequency:</b> Monthly. <b>Content:</b> Compiled by DLA.		
General Display	Dollars reported by month and year. Figure 97 shows the general display for procurement offset.		

#### **Relationships with Other Metrics**

#### **Key Relationship**

Lateral Redistribution   Supply Management Costs		
Supply Management Costs	Because procurement offsets reduce the amount of stock procured, they reduce materiel obligation costs. Because procurement offsets may reduce the number of procurements, they could also reduce the overhead costs associated with procurement actions.	

# **Routing Identifier Code (RIC) Participation**

#### **Use of RIC Participation**

RIC participation is a measure of how many retail activities (identified by their RIC) participate in the ISV program.

Figure 98 shows how the metric is displayed.





**RIC Participation** 

# **Development of RIC Participation**

Attribute	<b>Cost and Responsiveness:</b> Effective use of retail stocks surplus to requirements can decrease DLA procurement costs and improve its responsiveness.		
External or Internal	<b>Internal:</b> The number of participating retail activities is captured by DLA.		

# Description of RIC Participation

Definition	A total count of distinct RICs the military services have indicated are eligible to participate in ISV and respond to requests, either through lateral redistribution or procurement offset, according to business rules set forth by each service.		
Business Value	Focusing on the number of retail activities participating in ISV will help maximize the number of RICs and enable efficient reutilization of service- owned, DLA-managed materiel to fill backorders and offset procurements.		
Goals and Objective	An objective of ISV is active involvement by the military services and participation by all eligible RICs.		
Computation	Data is pulled from the DLA Total Asset Visibility system.		
OSD Data Requirements	Frequency: Monthly. Content: Compiled by DLA.		

General Display

Number reported by month and military service. Figure 98 shows the general display for RIC participation.

# **Relationships with Other Metrics**

Key Relationships RIC Participation Procurement Offsets

Lateral Redistribution	Lateral redistribution is a function of the number of retail activities participating in the ISV program. The higher that number, the greater the possibility that more retail surplus stock will be available for lateral redistribution.	
Procurement Offset	Procurement offsets are a function of the number of retail activities participating in the ISV program. The higher that number, the greater the possibility that more retail surplus stock will be available for procurement offsets.	

# **Appendix A. Criteria 2 and 3 for Selection of Enterprise Metrics**

# **Criterion 2. Metrics and Supply Processes**

Metric	4140 Policy Process	Specific Procedures and Organizational Elements	Rationale
Demand forecast accuracy and bias	Planning	Demand planning done by ICPs and suppliers	Forecasts are the basis for most materiel management decisions. Measuring and improving the accuracy of those forecasts support good materiel management and better allocation of resources.
Procurement lead time	Make / Maintain	ICP supply planning and measurement of resupply times	Timely delivery of procured materiel according to plan is essential to filling customer demand. Measuring and reducing the time to delivery are key to good materiel management and meeting customers need dates, while considering supply chain (management) costs.
Procurement lead time variance	Make / Maintain	ICP supply planning and measurement of variability in resupply times	Timely delivery of procured materiel according to plan is essential to filling customer demand. Measuring and reducing the time to delivery materiel are key to good materiel management and meeting customers need dates while considering supply chain (management) costs.
Unserviceable DLR return times and over- aged due-ins	Return	ICP supply planning and the customer return process	Timely return of materiel in need of return is essential to scheduling and inducting repairs needed to fill demand. Measuring and controlling the time to return unserviceable items supports good materiel management.
Customer wait time	Delivery	Order fulfillment by retail supply activities supporting weapon system maintainers.	The time to provide replacements for items that have failed is the basis for supporting weapon system readiness. Measuring and controlling that time is key to sustaining weapon system readiness.
Perfect order fulfillment	Delivery	Order fulfillment by DoD suppliers to retail supply activities	Timely, accurate, and quality delivery of order materiel are essential to retail supply activities filling warfighter demand. Tracking if deliveries are on-time, in the right quantities, and in the right condition is important.
Fill rate	Delivery	Order fulfillment by DoD suppliers to retail supply activities	An immediate issue means that the DoD supplier was able to fill the customer's requisition with on-hand inventory. Fill rate measures the percentage of time that happens for stocked items.
Tiered inventory turn	Planning & Financial	Financial assessment of level setting by DoD suppliers	It is standard commercial practice to measure the number of times that inventory turns. Suppliers use this metric to determine if they are stocking items that sell. By focusing on demand-based, serviceable inventories, DoD suppliers can also judge if they are stocking the right quantities of the right items. Only forecastable items have demand-based, serviceable inventories.

Metric	4140 Policy Process	Specific Procedures and Organizational Elements	Rationale
Excess on-hand inventory	Planning & Financial	Requirements determination and disposal reviews by DoD suppliers	On-hand inventory stratified as serviceable and unserviceable excess indicates how well DoD suppliers are managing their inventories. A low percentage of excess inventory and prompt disposal reviews are signs of good management.
Due-in long supply	Planning, Sourcing & Financial	Contracting by DoD suppliers and contract termination actions	On-order inventory stratified as long supply indicates that the DoD suppliers are buying inventory that will not be needed in the short- term when delivered. A low percentage of on- order excess and prompt contract termination actions are signs of good management.
Denial rates	Delivery & Asset Visibility	Warehouse issuing of stock for delivery	Good warehouse management and stock control translates to issues of stored materiel without delay; whereas warehouse denials result in delays. Maintaining low denial rates is key to good warehouse management.
Non-mission capable rates	Planning	Level setting for weapon system items by DoD suppliers	A key indicator of how well the DoD supply chain supports operating forces is the readiness rates of weapons systems. Lack of success is measured by the percentage of time systems are not able to perform their mission due to materiel shortages.
NMCS/ CASREP/MICAP backorders	Sourcing	Backorder expediting by DoD suppliers	Materiel shortages cannot only down a weapon system but extended time on backorder will extend the time the weapon system is not able to perform. Expediting the satisfaction of NMCS/ CASREP/MICAP backorders reduces that time.
Value of inventory	Planning & Financial	Level setting, retention limits, and disposal reviews by DoD suppliers	DoD materiel managers invest in inventory to provide a rapid response to customer materiel orders. Knowing the size of that investment and how it segmented and the reasons for stockage of materiel helps to improve overall inventory management.
Log cost baseline	Planning & Financial	Sizing logistics costs to the customer	Each year, DoD units are given operating and maintenance funding to pay for their logistics needs. Tracking the annual costs of the three major logistics functions—maintenance, supply, and transportation—is part of monitoring those costs.
Supply management costs	All	All WCF costs associated with acquiring materiel and managing.	To know if the DoD supply chain is cost effective, the total cost of the chain must be collected. Many of the sub-costs for processes performed by individual organizations are captured, aggregated, and paid for in the surcharges (or cost recovery rates) that those organizations charge to their customers. Managing supply chain costs assists in maintaining customers' (war fighters) buying power.
Criteria 2 and 3 for Selection of Enterprise Metrics

### **Criterion 3. Desired Behaviors and Metrics**

Supply Chain Objective	Desired Behavior	Metric – How It Supports Desired Behavior
Forecasting demand	Work toward more accurate forecasts to drive fewer excesses and better supply support.	<b>Forecast accuracy:</b> Provides a baseline for improvement and focuses management attention on more accurate forecasts.
Acquiring materiel	Work toward shorter supply chain cycle times to reduce inventory and provide a more agile supply system.	<b>Procurement lead time and variance and unserviceable return time:</b> Provide baselines for improving cycle times for three major sources of resupply and focus management attention on reducing those times.
Managing materiel	Work toward right- sizing and improving the productivity of DoD inventories, while maintaining high levels of customer satisfaction.	<ul> <li>CWT and LRT: Measure how fast the DoD supply chain responds to its customers at both the retail and wholesale levels and focuses management attention on timely customer support.</li> <li>POF: Measures how well wholesale suppliers respond to their customers and focuses management attention on timeliness and quality.</li> <li>Fill rate: Measures customer satisfaction for wholesale inventories and serves as a gauge for efforts to improve inventory productivity.</li> <li>Tiered inventory turn: Provides a sizing of inventory relative to customer demand and serves as a measure of success in reducing inventory levels.</li> <li>Excess on-hand inventory and due-in potential future excess:_ Measures potential excesses in on-hand and on-order inventories.</li> <li>Denial rates: An indicator of the effectiveness of distribution depots in supporting customer satisfaction with inventory they store.</li> </ul>
Sustaining readiness	Work to ensure the DoD supply chain continuously supports the needs of operating forces.	<b>NMC rates:</b> An indicator of how well the DoD supply chain is accomplishing its primary mission of supporting the operating forces. <b>NMC backorders:</b> Measures the responsiveness of the DoD supply chain in satisfying shortfalls in materiel needed to sustain operations.
Controlling costs	Work to reduce materiel, operating, and management costs, while not adversely affecting performance.	<ul> <li>Value of inventory: Measures the DoD investment in inventory.</li> <li>Log cost baseline: An indicator of how much the warfighter is paying for the three primary functions of logistics—maintenance, supply, and transportation.</li> <li>Supply management costs: A measure of how much it costs the Department to manage its inventory.</li> </ul>

### **Appendix B. Enterprise Metrics Data Submission Requirements**

Metric	Data Source	Frequency	Content
Customer wait time (O level)	Military services (aggregate monthly times computed by OSD)	<ul><li>Monthly</li><li>Quarterly</li></ul>	<ul> <li>Individual records for each order placed by field-level weapon system maintainers</li> <li>For services with annual performance goals, year-to-date performance against their goal</li> </ul>
Demand forecast accuracy and bias	Military services and DLA	Semi-annually	<ul> <li>The accuracy and bias of annual demand forecasts, including the numerator and denominator for the accuracy and bias calculations</li> <li>The accuracy distribution of items and dollar demand with a segmentation that allow for DoD roll-up</li> </ul>
Denial rates	DLA	Quarterly	<ul> <li>Denial rates by issuing service and DLA</li> </ul>
Excess on-hand	Military services and DLA	Semi-annually	<ul> <li>Dollar value of PRS</li> <li>Percentage of total value of inventory that is excess</li> </ul>
Inventory segmentation of no demand items	Military services and DLA	Semi-annually	• Dollar value of inventory segments (AAO, ERS, CRS, and PRS) for items that have 5 years of no demand, 6 years of no demand, and 10+ years of no demand
Log cost baseline	DoD budget	Annually	• Financial exhibits for 0&M costs and data on manpower costs
Logistics response time	LMARS (aggregate monthly times computed by OSD)	Monthly	• Individual records for each requisition placed on wholesale sources of supply
NMC rates	Military services	Quarterly	• For aggregate weapon system groups and key weapon systems in the Quarterly Readiness Report to Congress, mission capable rates. Besides NMCM and NMCS rates, submissions should include applicable FMC, PMC, and MC rates. For Navy ships, equivalent rates are percentage of time with C3 and C4 CASREPs
NMCS backorders	Military services and DLA (DoD totals computed by OSD)	Monthly	• On-hand backorders for requisitions that are coded to reflect a NMCS or ship CASREP condition divided between those backorders that are 0 to

Metric	Data Source	Frequency	Content
			30 days old and those greater than 30 days old
Procurement lead time variances	Military services and DLA (DoD totals computed by OSD)	Semi-annually	<ul> <li>The number of items awarded contracts in a quarter and the difference between the actual ALT and the ALT in the file at the time the procurement request was generated</li> <li>The distribution of items based on ALT differences in 30-day intervals, from -300 days to 300+ days</li> <li>The number of items whose procurements were delivered in a quarter and the difference the actual PLT and the PLT in the file at the time the procurement was awarded</li> <li>The distribution of items based on PLT differences in 30-day intervals, from -300 days to 300+ days</li> </ul>
Procurement lead times	Military services and DLA (DoD totals computed by OSD)	Semi-annually	<ul> <li>For items awarded contracts in a quarter, the average ALT</li> <li>For items whose procurements were delivered in a quarter, the average PLT</li> </ul>
Supply management costs	Military services and DLA	Annually	• The actual materiel obligations and supply management and support costs for a year in the form of a financial Fund 1 exhibit
Supply management cost changes	Military services and DLA	Annually	• The actual materiel obligations and supply management and support costs for a year in the form of a financial Fund 1 exhibit
TDD compliance	USTRANSCOM	Monthly	<ul> <li>The percentage of global, CONUS, and COCOM shipments that meet TDD standards</li> <li>The number of global, CONUS, and COCOM shipments</li> </ul>
Due-in long supply	Military services and DLA	Semi-annually	<ul> <li>Dollar value of total on-order stocks that are on contract</li> <li>Dollar value of on-contract stocks that are above the AAO</li> <li>Dollar value of on-contract stocks that are potential retention (i.e., ERS and CRS)</li> <li>Dollar value of on-contract stocks that are potential reutilization (i.e., PRS)</li> <li>Percentage of total on-order stocks that are above the AAO</li> <li>Percentage of total on-order stocks that as that are above the AAO</li> <li>Percentage of total on-order stocks that are store that are above the AAO</li> <li>Percentage of total on-order stocks that as that stratify to retention</li> </ul>

Enterprise Metrics Data Submission Requirements

Metric	Data Source	Frequency	Content
Unserviceable DLR over-aged due-ins	Military services	Quarterly	• The number and dollar value of unserviceable DLR over-aged due-ins at the end of a quarter, broken out by CONUS and OCONUS origins
Unserviceable DLR return time	Military services	Quarterly	• The median return time and number and dollar value of unserviceable DLR returns in a quarter, broken out by CONUS and OCONUS origins
Value of secondary item inventory	Military services and DLA (DoD totals computed by OSD)	Semi-annually	• The dollar values of inventory segments reported for the SSIR and modified to exclude fuels and SSIR in- transit stocks and revalue anticipated condemnations and PRS to full value
Wholesale perfect order fulfillment	LMARS (percentages for on-time, correct quantity, sufficient quality, and proper documentation computed by OSD)	Monthly	• Individual records for each requisition placed on wholesale sources of supply with their MRA coding indicating a discrepancy or no discrepancy
Wholesale supply availability	Military services and DLA (availability percentages computed by OSD)	Monthly	<ul> <li>The number of demands placed on a military service or DLA</li> <li>The number of demands placed on a military service or DLA that were backordered</li> <li>The number of on-hand backorders at the end of the month</li> <li>The number of on-hand backorders at the end of the month that are 180 days or more old</li> </ul>

## **Appendix C. Abbreviations**

AAO	approved acquisition objective
ALT	administrative lead time
ASD(L&MR)	Assistant Secretary of Defense for Logistics and Materiel Readiness
AWC	awaiting carcass
C3/C4 CASREPs	C3 and C4 casualty reports
CIMIP	Comprehensive Inventory Management Improvement Plan
СОСОМ	combatant command
CONUS	continental United States
CRS	contingency retention stock
CWT	customer wait time
СШТом	customer wait time for organizational maintenance
DILS	due-in long supply
DLA	Defense Logistics Agency
DLM	Defense Logistics Manual
DLR	depot-level reparable
DoD	Department of Defense
DoDI	DoD instruction
DORRA	DLA Office of Operations Research and Research Analysis
DVD	direct vendor delivery
EMQ	economic movement quantity
ERL	economic retention limit
ERS	economic retention stock
ESB	economic SKU build
FMC	fully mission capable
FY	fiscal year
ICE	Inventory Control Effectiveness
ICP	inventory control point
IPG	issue priority group
ISV	in-storage visibility
J8	DLA Financial Center
LMARS	logistics metrics analysis reporting system
LOT	life-of-type
LRT	logistics response time
MAC	moving average cost
MC	mission capable
MILSTRAP	Military Standard Transaction Reporting and Accountability Procedures
MLDT	mean logistics delay time
MRA	materiel receipt acknowledgement

NMC	not mission capable
NMCM	not mission capable maintenance (NMC-Maintenance)
NMCS	not mission capable supply (NMC-Supply)
NSN	national stock number
OCONUS	outside the continental United States
ODASD(SCI)	Office of the Deputy Assistant Secretary of Defense for Supply Chain Integration
0&M	operations and maintenance
OSD	Office of the Secretary of Defense
PLT	production lead time
РМС	partially mission capable
POF	perfect order fulfillment
PRS	potential reutilization stock
RIC	routing identifier code
RID	routing identifier
SKU	stock keeping unit
SNO	Strategic Network Optimization
SSIR	Supply System Inventory Report
TDD	time definite delivery
USTRANSCOM	U.S. Transportation Command
WCF	working capital fund

# **Appendix D. Definitions**

administrative lead time	The time interval between initiation of a purchase request and the date a contract is signed.
anticipated condemnations	Unserviceable assets that are not expected to be recovered during the repair process. Does not include items currently in supply condition H (condemned).
approved acquisition objective	The quantity of an item authorized for peacetime and wartime requirements to equip and sustain U.S. and allied forces according to current DoD policies and plans. That quantity must be sufficient to support other U.S. government agencies, as applicable.
contingency retention	Quantity of on-hand inventory authorized above the AAO and economic retention for which there is no predictable demand or peacetime requirement, but use in specific contingencies justifies retention.
cost	The price paid for the supply chain resources required to deliver a specific performance outcome. Cost effectiveness is key to right-sizing the DoD inventory investment and controlling supply chain costs. This attribute is an implied constraint on supply chain operations; cost metrics evaluate the DoD investment in the supply chain and assess financial effects on supply chain customers.
customer cost change	Quantifies the changes in overhead and materiel acquisition costs from one year to the next year.
customer wait time	A measurement of the total elapsed time in days between the issuance of a customer order and satisfaction of that order. The following definitions apply to specific customer wait time metrics:
	CWT for organizational maintenance: A measurement of the total elapsed time between submission of a customer order from organizational maintenance and receipt of that order by organizational maintenance.
	CWT for performance budget reporting: The same as customer wait time for organizational maintenance except a military service may elect to limit measurements to orders for items in their budget and management authority.
	CWT for depot maintenance: A measurement of the total elapsed time between submission of a customer order from depot maintenance and receipt of that order by depot maintenance.
demand	An indication of a requirement, a requisition or similar request for an item of supply or an individual item. Demands are categorized as either recurring or non-recurring.
demand forecast error and bias	The difference between actual demand and forecasted demand, stated in a manner that quantifies any bias towards over- or under- forecasting.
depot mapping	Charting customers with their associated materiel demands to primary storage locations.

due-in long supply	The dollar value of that portion of secondary item on-contract procurements that stratifies above the AAO.
due-in potential future excess	The dollar value of that portion of secondary item on contract that stratifies as PRS
economic retention	Stock above the approved acquisition objective that is more economical to retain than to dispose of and then potentially repurchase. The economic retention limit is the maximum quantity of on-hand materiel that may be retained in stock, as the applicable retention rules determine.
enterprise level metric	A metric that measures performance across major supply chain functional areas (such as inventory management, distribution management, acquisition management, and maintenance management) and can be used to describe the overall effectiveness of the supply chain.
excess on-hand	The dollar value of secondary item inventory that is categorized as PRS at the end of the measured period, and the percentage of the total inventory dollars that potential reutilization stock constitutes.
functional level metric	A metric that measures performance within a major supply chain functional area.
inventory segmentation of no demand items	Inventory dollars for items with 5 or more years of no demand further segmented in approved acquisition objective (AAO), economic retention stock (ERS), contingency retention stock (CRS), potential reutilization stock (PRS), and anticipated condemnations.
log cost baseline	The costs that DoD customers pay for logistics. It is the total of operations and maintenance costs and military and civilian personnel costs for the logistics activities that are primarily under the purview of the Assistant Secretary of Defense for Logistics and Materiel Readiness—supply, maintenance, and transportation.
logistics response time	A measurement of the total elapsed time (in days) from customer requisition to receipt of materiel ordered from a DoD organic or commercial source of supply. The measurement of logistics response time is from the date in the requisition that a retail supply activity places on a DoD or designated commercial source of supply until the date the requisitioned materiel is received and posted in the requisitioner's materiel management system.
materiel denial rate	The percentage of line items directed for shipment that distribution depots reported as a failure to ship all or part of the quantity originally directed for shipment.
materiel readiness	The ability of the supply chain to support weapon systems when undertaking and sustaining their assigned missions at planned peacetime and wartime utilization rates. Supporting materiel readiness is the mission imperative of the end-to-end DoD supply chain.
not mission capable rates	The percentage of time a system or equipment is not capable of performing any of its assigned missions because of maintenance requirements (not mission capable due to maintenance, NMCM) or a supply shortage (not mission capable due to supply, or NMCS).

	Mission capable, or MC, indicates a system or equipment is able to perform one of its assigned missions, while full-mission capable, or FMC, indicates a system or equipment is able to perform all of its assigned missions. The difference between full-mission capable and mission capable is partially mission capable, or PMC.
	Although naval aircraft readiness is evaluated in terms of not mission capable rates, the readiness of Navy ships, submarines, and shipboard systems is evaluated in terms of casualty reports, or CASREPs. Specifically, C3 and C4 CASREPs indicate an NMC condition for Navy ships, submarines and shipboard systems.
not mission capable due to supply backorders	The number of wholesale backorders that are associated with a NMCS condition, grouped for recognition of backorders less than 30 days old and those older than 30 days.
order response time	The percentage of all organizational maintenance orders (i.e., open and completed orders) falling within pre-designated wait time buckets.
perfect order fulfillment	See wholesale perfect order fulfillment.
planning and precision	The ability of the supply chain to accurately anticipate customer requirements and plan, coordinate, and execute accordingly. Planning and precision metrics are key to DoD supply chain management. Their effectiveness affects all of the other attributes.
potential reutilization	Stock above the approved acquisition objective and retention stocks identified for potential reuse.
procurement lead time	The sum of the administrative lead time (ALT) and production lead time (PLT). Procurement lead time is the time required for acquisition of secondary items.
procurement lead time variance	The variance or difference between actual lead times and lead times used to build requirements, where the lead times are administrative and production lead time.
production lead time	The interval between letting of a contract or placing an order and receiving the purchased materiel into the supply system.
reliability	The dependability and consistency of the supply chain providers to deliver required materiel support at a time and place specified by the customer. Reliability is key to DoD customer confidence in the DoD supply chain. This attribute focuses on how well the supply chain processes are being executed.
requirement	This quantity includes the military department– and DLA-forecasted demands for a national stock number (NSN) plus the NSN's pipelines (to support normal supply operations) and levels (to support minor interruptions in the normal supply operations).
response time effectiveness	<ul> <li>The times and percentages of weapon system support orders filled</li> <li>at the retail level or forward stockage point,</li> <li>at the wholesale level (i.e., ICP and distribution depot), and</li> <li>by supply chain suppliers.</li> </ul>

responsiveness	The ability of the DoD supply chain to respond to customer materiel requests by providing the right support when and where it is needed. For DoD, responsiveness is the speed at which the DoD supply chain fulfills warfighter needs. This attribute is most representative of the customer's perspective of the DoD supply chain.
stock positioning	Decisions on the placement of materiel for storage within the DoD distribution system. Stock positioning decisions are integrated with inventory planning to minimize the total cost to meet customer requirements.
supply management costs	The management costs incurred by working capital funded supply activities. Supply management costs include overhead and materiel obligations costs.
time definite delivery	The concept that, within a specified degree of probability, the logistics system is capable of delivering required materiel to the customer within a given period.
time definite delivery compliance	The percentage of time the logistics system is capable of delivering required materiel to the customer within a given period. As a metric, it measures the count and percentage of shipments that meet the time definite delivery standards for a given combatant command and transportation mode. For this metric, backorder time is excluded.
time definite delivery standard	The time to order and receive required materiel from the wholesale echelon of supply. Assignment of a standard is based on the customer's location and the priority the customer places on the order.
tiered inventory turns	The number of times that inventory cycles or turns over in a year. A tiered approach looks at specific layers of inventory and their turn cycles.
unserviceable DLR return time	Unserviceable depot-level reparable return (DLR) time is the sum of base-processing time and in-transit time for an unserviceable return. It begins when an organizational- or intermediate-level maintenance activity turns into supply an unserviceable DLR that it cannot repair; it ends when the receipt of the unserviceable asset by a distribution depot or maintenance contractor is recorded by the materiel manager.
value of secondary item inventory	The dollar value of DoD secondary item inventory by inventory segment.
wholesale perfect order fulfillment	The percentage of demands placed on the wholesale echelon of supply that are delivered (1) on time with the (2) correct item and quantity, in the (3) right condition, and (4) proper documentation. A perfect order has no discrepancies or failures in all four conditions of a perfect order. A failure of any one condition is a total failure for that order.
wholesale supply availability	The percentage of demands placed on the wholesale echelon of supply that are not backordered, excluding future material obligations. Supply availability is synonymous with supply materiel availability and material availability.

