Logistics Management Institute

Performance Metrics for Defense Working Capital Funds

A Focus on Supply Management

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Many Department of Defense (DoD) support organizations are financed with revolving funds to take advantage of the flexibility offered by them. DoD is interested in developing performance metrics applicable to program analysis of defense support business areas. Key indicators geared to assist Inventory Control Points and senior DoD officials evaluate the overall performance of the Supply Management Business.

This report, the second in a series focusing on the Defense Working Capital Fund (DWCF), explores the Supply Management Business Area. Using the Balanced Scorecard, this report identifies 19 metrics and evaluates the potential for near-term implementation at the DoD Inventory Control Points. A major consideration in this analysis was data availability and minimizing the new data requirements. An in-depth discussion has been provided in the appendix describing the data availability and data manipulation requirements to implement the metrics.

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Executive Summary

To improve the visibility of resources within and among the defense business areas, the Director of Program Analysis and Evaluation, Office of the Secretary of Defense (OSD), levied new reporting requirements on the Department of Defense (DoD) components. These reporting requirements continue to be reviewed and expanded; however, performance metrics are expected to play a key role in evaluating the business areas. In previous research, we developed performance metrics for the Depot Maintenance Business Area based on a specific analysis of this major business area. For the present research, we developed and evaluated performance metrics for the Supply Management Business Area. Specifically, the focus was on the Inventory Control Point (ICP) and its operations.

Using a structured analysis methodology and applying the Balanced Scorecard, we identified 19 potential performance measures for the Supply Management Business Area of the Defense Working Capital Fund (DWCF). The Inventory Control Point (ICP) managers were the primary users for which the metrics were developed; however, the same information would also be valuable for the senior Service, agency, and DoD logistics leadership.

We used the matrix shown below for the identification of appropriate metrics for the Supply Management Business Area of the DWCF. The analysis methodology developed for this study effort required the early identification of "success factors", which are those key areas in an organization required for that organization to achieve its strategic objectives. The six key success factors, shown as column headings in Table ES-1, were identified through a review of DoD, Service, and agency documents as being critical to achieving the strategic goals of DoD. In addition, the basic Balanced Scorecard approach, supplemented with current adaptations of this fundamental performance measurement tool, was used to identify the appropriate "perspectives" of the proposed measurement model shown as rows in Table ES-1. These perspectives ensure that all aspects of an organization are represented in the developed metrics.

Table ES-1. Proposed Metric Areas

Perspectives	Success Factors					
	Reduce LRT	Leverage Private Sector	Utilize Best Value	Reduce Excess Capacity	Improvement Inventory Efficiency	Increased Use of Technology
Financial Performance						
Customer Satisfaction						
Product/ Service Quality						
Operational Performance						
Supplier Performance						
Employee Satisfaction						

The proposed metrics, shown in Table ES-2, are the results of a review of existing DoD and commercial metrics in the supply functional area. In some cases, existing metrics were refined to reflect the changes in business practices occurring within DoD (e.g., Prime Vendor and Direct Vendor Delivery). In many cases, new metrics were developed and presented as replacements for existing metrics. In other cases, new metrics were developed to focus on critical problems identified in DoD and commercial documents. Although many metrics were considered and initially evaluated, we believe the 19 metrics shown below have specific advantages over other considered metrics. In addition, we believe these metrics provide acceptable coverage of the selected success factors and perspectives without adding excessive data collection requirements on the Services and agencies.

Each proposed metric was next examined to identify both advantages and disadvantages, especially with respect to data availability. An underlying premise of this analysis was to minimize new data collection requirements; however, this was constantly balanced with the need to maximize the value and accuracy of the metric to the users, the ICPs, and DoD senior leadership.

The result of the analysis was that 12 of the 19 metrics were recommended for implementation; however, in some cases caveats were added that highlighted the requirement to examine a specific aspect of implementation. For example, in a few cases, minor data processing routines would be required to implement the metric. The caveat stated that the effort to develop the data routine would have to be evaluated to ensure that its "cost" was warranted.

Table ES-2. Proposed Metrics

	Success Factors					
Perspectives	Reduce LRT	Leverage Private Sector	Utilize Best Value	Reduce Excess Capacity	Improve Inventory Efficiency	Increased Use of Technology
Financial Performance		(4) Standard Price Change Ratio (DoD/Private) (5) Percentage of Gross Sales Delivered Directly from the Supplier to the User	(8a) Percentage of Management Cost Change Compared to Percentage of Gross Customer Order Change (8b) Percentage of Materiel Cost Change Compared to Percentage of Gross Customer Order Change	(10) Warehouse Utilization	(12) Organic Inventory Turns	
Customer Satisfaction	(1) Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)	(6) Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD [Planned] Shipments During a Specified Period)			(13) Weighted Supply Availability (14) Percentage of Customer Returns Due to ICP Errors	(17) Percentage of Redundant Requisitions
Product/Service Quality	(2) ICP Processing Time					(18) Percentage of Total Asset Visibility and Accessibility Achieved
Operational Performance		(7) Percentage of Total Gross Sales for PV/DVD (Planned) Items		(11) Gross Customer Orders (at LAC)	(15) Percentage of Inapplicable Orders (Secondary Items) (16) Supply Availability	(19) Percentage of Transactions Performed Electronically
Supplier Performance	(3) Weighted Source Cycle Time		(9) Percentage of ICP-Supplier Items Filled On-Time (Excludes PV/DVD [Planned])			

The report discusses each metric in detail, focusing primarily on identifying the specific data source for each metric. This information is important to those desiring more specific details on the data source and data manipulation required to capture data and compute the metric.

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Chapter 1
Introduction

The use of resources within Department of Defense (DoD) business areas, and the interaction between many of them, lacks visibility. This problem has hampered, and continues to hamper, an evaluation of the use of resources in the Defense Working Capital Funds (DWCF) and stifles the ability of the Defense Program Review to support the senior DoD leadership in these areas. This problem may again be highlighted when the DoD conducts the next Quadrennial Defense Review (QDR). Regardless of the specific findings in the next QDR, the senior leadership needs to be better informed about the status of all DWCF resources and the impact of their use.

To improve the visibility of resources within and among the defense business areas, the Director of Program Analysis and Evaluation, Office of the Secretary of Defense (OSD), levied new reporting requirements on the DoD components. These reporting requirements continue to be reviewed and expanded; however, performance metrics are expected to play a key role in evaluating the business areas. For example, LMI developed performance metrics for the Depot Maintenance Business Area based on a specific analysis of this major business area. Similarly, this document reports on recent analysis in which LMI developed and evaluated performance metrics for the Supply Management Business Area. Specifically, the focus was on the Inventory Control Point (ICP) and its operations.

OBJECTIVE

The purpose of this study was to develop a set of metrics that senior DoD managers, primarily at the OSD level, can use to monitor key areas of interest to attain the department's strategic logistics objectives. The outcome of this effort is a set of performance measures with a common focus on the ICP. This focus was selected because these organizations make, control, or influence the outcome of the major decisions that drive customer service levels, types of service (e.g., Prime Vendor [PV], Direct Vendor Delivery [DVD]), stockage policies, and the financial status of the Supply Management Business Area. A major theme of this study was to produce metrics that linked with strategic logistics objectives in DoD documents that reflect the vision of the department. This study builds on the methodology in the Depot Maintenance study in several respects. The following chapter addresses the revised methodology in detail.

A primary concern in this analysis was that the activity measured (e.g., "ICP Processing Time"), and the manner in which it was measured, would be appropriate for the senior level of leadership in OSD, and would represent an activity for which the ICP could reasonably be held accountable. Also, unlike the Depot

Maintenance study, this study did not restrict the areas of inquiry based on preconceived issues of data availability. Also, we examined both government and commercial sectors for existing metrics because the supply management functional area is more similar to the commercial sector than was the case for depot maintenance.

REPORT FORMAT

This report documents, at a summary level, the analysis methodology and the results of this study. The following chapter discusses the methodology and the major steps of this analysis. Next, the proposed metrics will be displayed in the framework of this analysis. Subsequently, each metric will be discussed briefly in narrative form. The last section, as an appendix, will discuss each metric in detail, emphasizing the data availability dimension of the metric. The final appendix lists abbreviations used in this report.

Chapter 2
Methodology

This research builds on earlier research in the Depot Maintenance Business Area of the DWCF. Several initial constraints (e.g., data availability, restricted performance areas) placed on the earlier research were removed for this effort for several reasons:

- Desire for a broader, and, therefore, potentially more thorough, initial examination of potential metrics;
- Academic and private sector metrics in the supply functional area are more appropriate for DoD efforts than for the depot maintenance functional area; and
- A greater commonality exists between the commercial equivalent to the supply management function and the DoD function than for the depot maintenance functional area.

This less constrained approach was then used as the guideline to develop a detailed study methodology for this effort. This methodology was built on fundamental performance metrics research (i.e., the Balanced Scorecard); however, this early metrics research has been refined by many academicians and practitioners in recent years. In this analysis, we have considered and attempted to capture these refinements.

The major steps in our methodology for determining the appropriate performance measures for this functional area are outlined below.

- Review performance measurement literature to
  - ➤ identify the key steps in the development of a measurement system;
  - ➤ identify the performance categories (i.e., perspectives) suggested by the academicians as well as practitioners; and
  - ➤ identify the key criteria and characteristics for developing metrics to assist in the evaluation of existing metrics;
- Review DoD strategic documents to
  - ➤ identify those documents focused on logistics;

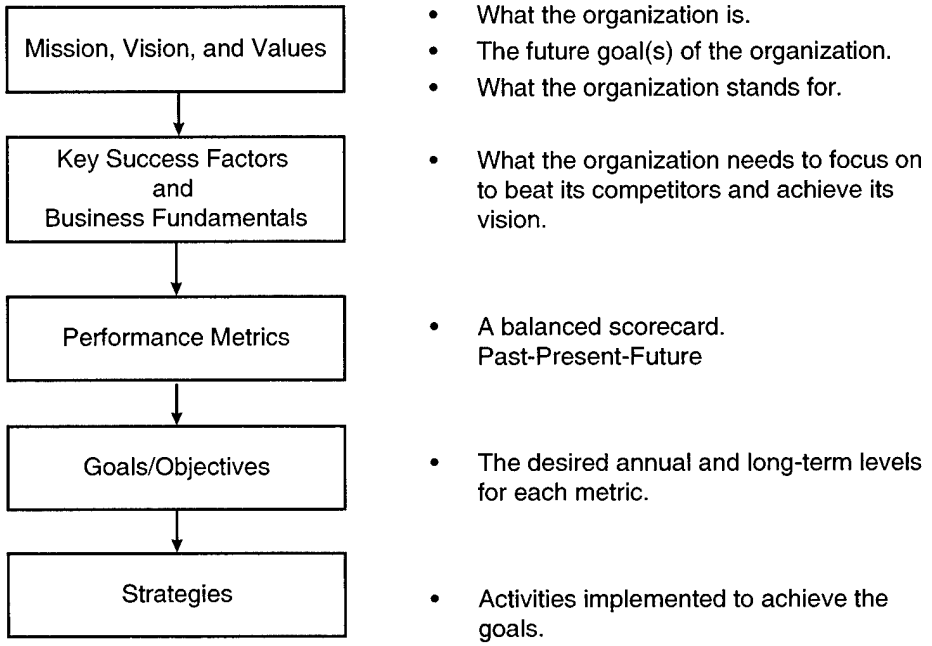
- identify the strategic objectives of DoD in the Supply Management Business Area; and
- identify the DoD senior managers' areas of interest and concern related to supply management (i.e., success factors);

- Propose a measurement model identifying both the recommended perspectives and success factors;
- Review existing documents with performance measures submitted to OSD by the components to
  - determine previous focal areas of performance measures; and
  - identify performance measures that data elements are commonly available;
- Construct an initial family of metrics based on the developed measurement model's categories (i.e., perspectives and success factors);
- Review commercial functional sources to
  - identify areas of focus not currently found in DoD; and
  - identify commercially used metrics not common to DoD;
- Match DoD focus areas and metrics to the success factors and metrics highlighted in the commercial literature to identify success factors and metrics that are
  - reported in current commercial and DoD documents (which may highlight information in the literature that will help refine DoD metrics.);
  - found in the commercial literature, but not found in DoD (which will assist in the identification of success factors that DoD should consider examining); and
  - found in DoD, but not found in the commercial literature (which may be very difficult because the commercial literature areas are frequently broad, and it may be impossible to state that a particular DoD metric does not fall into one of the broad performance categories);
- Refine or develop metrics based on the commercial literature review;
  - review, evaluate, and refine, if possible, existing metrics; and
  - develop metrics for areas not currently being measured in DoD, but are highlighted in the commercial literature;

- Evaluate the feasibility of each metric based on the availability of existing data or the prospects for data; and
- Report results to the sponsor.

Using this methodology, the initial focus of the analysis was the selection of a strategic measurement model. Figure 2-1 illustrates such a strategic measurement model[1] and was the model selected for this analysis.

Figure 2-1. Strategic Measurement Model



Having selected a strategic measurement model, the next step was to identify the strategic objectives. The mission, vision, and values (i.e., the strategic objectives) denoted in the strategic measurement model must be developed internally by the organization's management leaders (at many levels). Ideally, we would have met with the senior leadership to develop and refine the strategic objective; however, circumstances did not allow this level of participation for this analysis. Therefore, as a surrogate for this process, we conducted a review of key DoD strategic documents.

The review of performance measurement literature consistently highlighted a common theme. It insisted that performance measures, regardless of the measurement model, should link to the organization's strategic objectives in order to be an effective tool for business improvement. This linkage is normally achieved

[1] Mark Graham Brown, "Keeping Score—Using the Right Metrics to Drive World Class Performance," New York: *Quality Resources*, 1996.

by identifying performance measures that highlight the accomplishment of *key success factors*. Such factors are required for the organization to achieve its strategic objectives. Therefore, the strategic objectives first must be identified followed by the identification of the key success factors.

To identify the strategic objectives, and subsequently the key success factors, applicable to the Supply Management Business Area, we reviewed several DoD, Service, and agency documents. The purpose of this review was to identify those issues and concerns that were repeatedly referenced, and thus were considered significant. Repetition was considered to indicate that change in these areas would assist in achieving the strategic objectives. Through this analysis, we were able to identify seven prominent success factors. These factors were:

- Reduce Logistics Response Time (LRT)
- Leverage Private Sector
- Utilize Best Value
- Reduce Excess Capacity
- Improve Inventory Efficiency
- Improved Workforce[2]
- Increased Use of Technology.

Each literature source used some method of categorization to group and identify the minimum number of areas that require measurement. This categorization assists in looking across functional areas within the organization to ensure that one department is not measured extensively and optimized at the expense of others; but the ultimate reason was to assist in systematically identifying the appropriate metrics.

One popular method of identifying metrics, which ensures that they measure the impact on the organization as a whole (not just on one department), and of tying them back to the organization's strategic goals, is the Balanced Scorecard. Although we do not implement the Balanced Scorecard methodology, at least in its original form, in this analysis, we used its principles to develop metrics that were meaningful across functional areas.

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[2] We should note that the success factor "Improved Workforce" was examined and potential metrics were identified; however, that was the extent of the analysis in this area. This area was identified by the project sponsor as not being unique to the Supply Management Business Area; therefore, metrics in this area should more appropriately be an area of focus for a separate cross-functional analysis. Therefore, no further information will be provided in this report for this success factor.

For example, the Balanced Scorecard and the many variations on it, state that one must look at performance measures from many viewpoints. The most common points of view, or "perspectives," are highlighted in Table 2-1.

Table 2-1. Performance Perspectives

Point of view	Question to ask of the organization	Performance measure
Financial	How do shareholders or sponsors perceive us?	Budget compliance Return on investment
Customer	How do customers see us?	Customer ranking surveys Order backlog
Internal	In what area must we excel?	Project closeout cycle Rework
Growth/Innovation	Can we continue to improve and create value?	Revenue from new sources

However, in addition to these perspectives, many literature sources highlighted the need to measure employee satisfaction and supplier performance. Although these two additional areas are not traditionally included in the Balanced Scorecard, they have received increased attention in recent studies. Based on the more recent research, we elected to add these two perspectives to the four more traditional perspectives. This resulted in the following six perspectives being used in this analysis:

- Financial Performance
- Customer Satisfaction
- Product/Service Quality
- Operational Performance
- Supplier Performance
- Employee Satisfaction.

The preceding steps established the framework for the metric areas in this analysis. These areas are shown in Table 2-2.

Table 2-2. Proposed Metric Areas

Perspectives	Success Factors					
	Reduce LRT	Leverage Private Sector	Utilize Best Value	Reduce Excess Capacity	Improvement Inventory Efficiency	Increased Use of Technology
Financial Performance						
Customer Satisfaction						
Product/ Service Quality						
Operational Performance						
Supplier Performance						
Employee Satisfaction						

The next major step was identifying metrics that were appropriate for this matrix. First, we reviewed existing metrics already reported to OSD or discussed in OSD or Service/agency documents. Reviewed documents included:

- Defense Planning Guidance
- DoD Logistics Strategic Plan (1998)
- Defense Logistics Agency (DLA) and Service strategic logistics plans
- Defense Reform Initiative
- DLA Performance Contract with Defense Management Council
- Defense Science Board report on acquisition reform (March 1998)
- Recent performance updates to Service logistics leadership
- Headquarters and National Inventory Control Point interviews
- Past budget submissions
- Past Program Objective Memorandum (POM) submissions.

In addition, research performed for DoD, both external to and within LMI, were reviewed to identify potential metrics. These metrics were then screened for their advantages and disadvantages for the ICP and senior DoD management. In some

instances, metrics were modified or refined based on this analysis process. This process resulted in an initial set of proposed metrics.

The next step focused on the review of the commercial sector literature and the metrics the commercial sector uses in their management of the supply management function. In addition to profit-oriented firms, we defined the commercial sector to include not-for-profit, academic, other research institutions, and the civil government sector. In a manner similar to that for the DoD supply metrics, commercial metrics were identified, evaluated, and compared to their DoD counterparts. In many cases, the commercial literature highlighted areas that allowed previously proposed metrics to be refined. In other cases, new metrics were added to the matrix.

The last step was to evaluate the data availability for the proposed metrics. We reviewed existing data sources and data systems to determine if the required data were already available. In those instances where data were not found to exist, either the metric was modified so that data would support it or recommendations for data collection were provided.

Chapter 3
Proposed Metrics and Discussion

This section presents the family of proposed metrics based on this analysis. As shown in Table 3-1, each metric correlates to a perspective and success factor discussed in the methodology. In each case, a metric is linked to an area identified in strategic documents as an area where improvement was desired or required.

The following section discusses each of the metrics displayed in Table 3-1. These metrics are grouped according to the respective success factor. The narrative provides an overview of metric and considerations in its selection. Data availability for each metric is discussed concluding with an overall recommendation concerning the metric and its implementation.

Additional information is provided in Appendix A for each proposed metric. Appendix A contains most of the supporting information from the narrative below; however, more detailed information is provided on data availability. Appendix A focuses on documenting the underlying information required for complete evaluation and implementation.

Each metric in Table 3-1 has a number assigned. This number is replicated in the narrative title for each metric as well as in Appendix A to assist the in cross-referencing the narrative information to the more detailed appendix data.

As was discussed in Chapter 2, the success factor "Improved Workforce" was removed from the analysis. This change led us to remove "Employee Satisfaction" as a perspective from the analysis, therefore, no metrics were reported in this perspective and no further reference will be made to this perspective.

SUCCESS FACTOR: REDUCE LRT

1. Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)

A customer requisitions an item with certain timeliness expectations, either explicitly stated in a required delivery date (RDD) or implicitly as defined by the Uniformed Materiel Movement and Issue Priority System (UMMIPS) standard. If these expectations are not met consistently, there is an underlying problem that must be investigated. This metric is intended to highlight a need for further investigation as well as to reflect achievements in correcting existing problems, if they exist.

Table 3-1. Proposed Metrics

	Success Factors					
Perspectives	Reduce LRT	Leverage Private Sector	Utilize Best Value	Reduce Excess Capacity	Improve Inventory Efficiency	Increased Use of Technology
Financial Performance		(4) Standard Price Change Ratio (DoD/Private) (5) Percentage of Gross Sales Delivered Directly from the Supplier to the User	(8a) Percentage of Management Cost Change Compared to Percentage of Gross Customer Order Change (8b) Percentage of Materiel Cost Change Compared to Percentage of Gross Customer Order Change	(10) Warehouse Utilization	(12) Organic Inventory Turns	
Customer Satisfaction	(1) Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)	(6) Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD [Planned] Shipments During a Specified Period)			(13) Weighted Supply Availability (14) Percentage of Customer Returns Due to ICP Errors	(17) Percentage of Redundant Requisitions
Product/Service Quality	(2) ICP Processing Time					(18) Percentage of Total Asset Visibility and Accessibility Achieved
Operational Performance		(7) Percentage of Total Gross Sales for PV/DVD (Planned) Items		(11) Gross Customer Orders (at LAC)	(15) Percentage of Inapplicable Orders (Secondary Items) (16) Supply Availability	(19) Percentage of Transactions Performed Electronically
Supplier Performance	(3) Weighted Source Cycle Time		(9) Percentage of ICP-Supplier Items Filled On-Time (Excludes PV/DVD [Planned])			

This metric evolved from evaluating the percentage of *requisitions* that were filled on-time (its original state) to reflecting the percentage of *items* delivered to the customer during a period that were "on-time" (its final state). One factor that caused this metric to evolve was the consideration that the ICP should receive credit for a partial fill of a requisition. In addition, in some cases, a partial fill is beneficial to the customer. Valid counter-arguments exist in both cases and were considered; however, the focus of this effort is from an ICP perspective. With this as the underlying focus, we elected to allow partial fills to be counted and so the number of *items* is counted versus the number of *requisitions*.

Data availability, collection, and evaluation are always a consideration, and they were a factor in developing the proposed metric. The Logistics Metrics Analysis Reporting System (LMARS) captures data from the Defense Automatic Addressing System (DAAS) for all requisitions except those submitted using commercial vendor software to Prime Vendors. We found the use of this data source appealing and we selected it because of the consistent manner it would gather and manipulate data. By using this data source, and by limiting the subset of captured transactions to completed transactions, we would need no additional data selection routines; however, to determine if a customer receipt is "on-time," we would need an additional data routine. We discuss the steps required in the data routine in Appendix A. The routine is straightforward and has been designed to use information already available in the LMARS files.

We believe, because of the proposed approach, the additional effort to capture the necessary data is offset by the value of the information provided. The proposed metric focuses on the ICP perspective. This is reflected in allowing partial fills to be captured. In addition, we selected the data fields not to penalize the ICP for its delays in receiving the requisition; however, by a minor modification (i.e., using a different field from the same data source), we can implement a metric emphasizing the customer perspective. In fact, with minor change, we can compute both metrics.

We recommend determining and evaluating the level of effort to develop and implement the proposed additional data computation routines. The implementation of this metric can be centralized, and it would not place additional data workload on the components.

2. ICP Processing Time

ICP Processing Time is a critical aspect of ICP operations. The customer looks to the ICP for timely satisfaction of a requisition, notwithstanding the existence of multiple factors that influence timeliness, some of which the ICP does not control. Nevertheless, the ICP does control the time that it spends to process a requisition.

This metric highlights information to the ICP leadership, allowing it to examine and evaluate methods to reduce the time to process a requisition. These methods might include internal prioritization procedures of acting on certain types of req-

uisitions as well as the methods to interface with the increasing number of commercial sources. By examining the segregated data underlying this metric, specific types of requisitions or categories of items may be identified as major contributors to problems. The examination of this measure and the subsequent actions will directly affect the total LRT and Customer Wait Time (CWT), which represent a dimension of the quality in the service and the product delivered to the user.

"ICP Processing Time" is defined as the elapsed time between the date the ICP receives a requisition and transmission date of a material release order (MRO) or when the ICP passes the requisition to a vendor for DVD (planned or unplanned). This metric has disadvantages. First, it gives only an indirect indication of on-time service. We intend to overcome this shortfall by supplementing this metric with metrics that highlight timeliness. Second, the metric will not capture many Prime Vendor requisitions. This metric does serve well to: (1) capture the ICP-controlled portion of the DoD supply system's response to a requisition to the wholesale supply system; (2) help ICP managers evaluate a specific element of the total logistics response time; and (3) enable a drill-down capability (i.e., stocked versus DVD) so the impact of management decisions can be evaluated.

The data for this metric is reported by LMARS. This LMARS data, reported by ICP and priority group/delivery region, means that a single, common data source will exist for all components, and data will be categorized consistently and summarized. More important, data are already collected, avoiding a new data requirement on the ICPs and other managers.

We recommend identifying this metric as one to be reported on a periodic basis. LMARS data is reported monthly; therefore, any reporting period, quarterly, semi-annual, or annual, requires only aggregation of monthly reports.

3. Weighted Source Cycle Time

This metric, as the previous one, focuses on time; however, this metric focuses on the time to replenish the ICP stocks, not the customers' stocks in the field. This metric looks both inside DoD (i.e., the repair depots) and outside DoD (i.e., external suppliers) to the organizations in the supply chain that provide the ICP with wholesale replenishments. Although a primary concern is reducing LRT, this metric also offers ICP managers information regarding the trade-offs of increased cost for reduced response time.

"Weighted Source Cycle Time" is defined as the dollar-weighted time to obtain assets from new procurement and from repair (i.e., depot maintenance). The metric is influenced not only by the time required for the ICP to acquire items, but also by the dollar value of the items being replenished. Thus, the metric will reflect the peculiarities of the alternative sources of acquisition and the resources spent on the items. This metric is similar to a commercial metric, "Source Cycle Time," in the Supply Chain Operations Reference (SCOR) model, but the pro-

posed metric weights the specific individual time segments to emphasize the cost of the items involved.

The metric has limitations. First, there is no correct answer. That is, a lower value for this metric is not necessarily better if it has increased the total cost to the ICP. These "costs" to the ICP are not just in material costs, but also include management considerations such as initiating procurement actions and coordinating with the repair facility. Second, a higher value for the metric, if uncontrolled or uncompensated, will increase LRT. Last, the metric does not allow response of different sources to be directly compared (i.e., an additional analysis may be required to understand underlying features that drive this metric).

Data, at the Service/agency level, are available annually in the budget documents (i.e., the Budget Estimate Submission [BES]). In addition, information is also available at the ICP level of detail on request from the ICPs. In the past, the data have been provided, and therefore should not create a new data requirement for the involved offices. We believe that PV/DVD should be excluded from this computation because the supplier has been paid to provide a level of service on an on-going basis (which is paying the supplier to have a predetermined ALT+PLT+delivery time *to the customer, not the supply depot,* where ALT is the administrative lead-time and PLT is the production lead-time).

The potential value of this metric to ICP managers combined with its existing data availability supports immediate implementation of the proposed metric. Details on computation are provided in Appendix A.

SUCCESS FACTOR: LEVERAGE PRIVATE SECTOR

4. Standard Price Change Ratio (DoD/Private)

Although we believe this metric is important, it is not feasible at this time. This is the first of several metrics associated with the shift to commercial practices; each of which has offered challenges with respect to data requirements. The data requirement for this metric is too intensive for a recurring process such as metrics computation.

The objective of the proposed metric was to compare the change in the standard price of items in two categories. The first category consists of items recently transitioned from DoD control (managed and stored in DoD warehouses) to items commercially supplied by PV/DVD. The second category comprises items that historically have been and remain under DoD control. The metric would be the ratio of the average standard price change for the DoD items divided by the average standard price change for items recently transitioned to commercially controlled status. The objective would be to see a ratio greater than 1.

The hypothesis is that the price of items, as seen by the customer, should decrease for items transitioning to the private sector. If this is not the case, the shift to

commercial practices may not be cost effective for the particular items being transitioned. Also, continuing to shift workload and responsibilities to the private sector may cause the price of DoD-controlled items to increase because the fixed costs are distributed over a smaller base.

The information above would be valuable to an ICP manager because it could provide an indicator that continued movement of items to PV/DVD may not be cost effective. It may also provide indicators, if more detailed data is gathered, that particular groups of items are less cost effective to transition to commercial or private-support.

Although this metric would provide important indicators concerning total cost, an area that requires closer examination in times of changing management practices, data availability is a roadblock. The material management systems do not support easy identification of items that have migrated, recently or in the past, to alternative management methods. Therefore, one can not simply identify an item as "PV" or "DVD." Identification is even more difficult when an item has transitioned between management methods. Identifying items that have recently migrated is very difficult.

For these reasons, we do not recommend implementing this metric at this time. We recommend considering a method to categorize items as "PV" or "DVD." This will require the cooperation of all Services and agencies to develop this methodology, especially DLA, which handles the majority of PV/DVD items. After such a methodology is in place, the proposed metric should be reviewed again for consideration.

5. Percentage of Gross Sales Delivered Directly from the Supplier to the User

A significant change is the shift to commercial practices. A major element of this change is the increased use of private suppliers as managers of DoD supplies. Although this use is more common in DLA for its managed items, the Services also are increasing reliance on practices such as PV and DVD.

An area of interest to an ICP manager should be the degree of direct dependence on the commercial sector to meet customer requirements. In fact, goals were established within DLA in this area, although these goals have since been deemphasized. The proposed metric will provide ICP managers with an indication of the direct support the commercial sector provides ICP customers.

Although an ICP manager does not directly control the workload placed on organic DoD distribution depots, this metric also will provide insight into the change in workload being placed upon the organic DoD distribution depots. This metric, in concert with "Warehouse Utilization," will highlight trends in depot workloads. This is an indirect concern of ICP managers because, as workloads

decrease, per-unit-distribution costs may increase because fixed distribution depot costs are allocated over a smaller business base.

The volume of sales not passing through organic DoD depots is not directly available. Similarly, gross sales from only the DoD distribution depots are not directly available. However, the gross sales of shipments from suppliers directly to users can be computed from the LMARS data. This may be computed by capturing those records reflecting shipments (i.e., sales) that are classified as PV/DVD (planned), PV/DVD (unplanned), and PV/DVD (non-stocked), and applying the unit price to the quantity of sales, at standard price. To compute the desired metric, this computed sales would be divided by the total gross sales reported (at standard price), which is available in the budget documents (i.e., BES, Form SM 4). These data are available by ICP; however, in some cases, Services will need to provide this detail data.

We recommend examining the effort to compute the sales from the LMARS records. This can be done centrally, and it will not add a burden to the Services/agencies. The only additional requirement on the Services, in some cases, would be to provide total gross sales data (at standard price) by ICP. This level of effort should not prevent this potentially valuable metric from being reported, on a minimum of an annual basis.

6. Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD [Planned] Shipments During a Specified Period)

As discussed earlier, a significant change in how customers are supported is ongoing. In a small sample of data, we found that approximately 25 percent of shipments during a 3-month period were PV/DVD (planned) shipments. This most likely will only increase. ICP managers and DoD logisticians should consider monitoring the timely support performance of these commercial suppliers. That is exactly the purpose of this metric.

This metric supplements the first metric discussed, which focused on how well customers' RDD for *all* shipments were being met. This metric is to capture and highlight a *subset* of all completed shipments to the ICPs' customers with respect to meeting the RDD. This subset consists of only those shipments for items the ICP has selected to support its customers directly from a commercial source (i.e., PV/DVD (planned)). This metric, in concert with "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)," may highlight problems in areas not specifically being captured by these metrics. Specifically, these metrics will implicitly provide timeliness information on shipments of the following type: PV/DVD (unplanned); non-stocked items; and backordered items.

This proposed metric, as was the case for the first metric, focuses on the ICP perspective. This is reflected in allowing partial fills to be captured. In addition, the data fields have been selected not to penalize the ICP for its delays in receiving the requisition; however, by a minor modification (i.e., using a different field

from the same data source), a metric emphasizing the customer perspective can be implemented. In fact, with minor changes, both metrics could be computed. This metric, assuming the "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)" is being computed as recommended, requires minimal additional effort. If these metrics are implemented simultaneously, the added computational effort for this metric is negligible.

We recommend determining and evaluating the level of effort required for the proposed data computation routines. The implementation of this metric, and that of the first metric discussed in this section, can be centralized, and they would not place additional data workloads on the components. We believe the potential value of this metric, especially in monitoring performance of the commercial support, is important enough to warrant some initial cost to implement this metric.

7. Percentage of Total Gross Sales for PV/DVD (Planned) Items

This metric, as a stand-alone metric, is a "level-of-effort" metric more than a "performance" metric. When used in tandem with other metrics, specifically "Percentage of Gross Sales Delivered Directly from the Supplier to the User," these metrics jointly allow a thorough understanding of how customers are being supported. The ICP manager can identify the planned proportion of support by commercial suppliers and the amount of unplanned commercial support.

In addition, the information above, when used with other proposed metrics, will provide insights into the cost impact of changing support from the more traditional method to direct commercial support. The two metrics, "Percentage of Management Cost Change Compared to Percentage of Gross Customer Order Change" and "Percentage of Materiel Cost Change Compared to Percentage of Gross Customer Order Change," when viewed with the proposed metric may provide a "cause-and-effect" relationship to be developed between costs and changes in the percentage of commercial support being planned.

The data required to support this metric is a subset of that required for the metric "Percentage of Gross Sales Delivered Directly from the Supplier to the User." By capturing the data for the "Percentage of Gross Sales Delivered Directly from the Supplier to the User" metric by type of shipment (i.e., PV/DVD (planned), PV/DVD (unplanned), and PV/DVD (non-stocked)), the metric proposed here can be computed with minimal additional data processing.

The type of support and the cost of changes in the types of support to customers strengthen our recommendation to include this metric in the set reported at the ICP level of detail. Although data for some Services is not available in the BES at ICP level, this data is available and the Service can provide it with minimal effect.

SUCCESS FACTOR: UTILIZE BEST VALUE

8a. Percentage of Management Cost Change Compared to Percentage of Gross Customer Order Change

AND

8b. Percentage of Materiel Cost Change Compared to Percentage of Gross Customer Order Change

These proposed metrics are the most complex of all the metrics discussed. Although it is desirable that the metrics be as "user friendly" as possible, simplicity in measuring the management and materiel cost areas can cause significant misinterpretation of the data and subsequently mislead management. Therefore, we propose the more complex, but more accurate, metrics discussed below.

At least one of the components has recommended a metric simply consisting of the cost of operations divided by the cost of materiel. This will highlight changes in one of the two major ICP cost elements: materiel costs. All other costs are denoted as management costs. The goal for this simple metric was to drive this ratio down, implying an emphasis on reducing management costs. However, this metric could mask a critical change occurring simultaneously: an increase in materiel costs.

Materiel costs are approximately 73 percent of an ICP's expense. Although management costs traditionally are considered more controllable than materiel, an increase in materiel costs, all other factors remaining constant, would drive this simple management-to-materiel cost ratio down. Therefore, an increase in total costs with no improvement in management efficiency would result in an improved ratio. The "right answer" for the "wrong reason."

The discussion above highlights the major reasons an improved metric was investigated. By individually comparing the change in materiel costs and the change in management costs to the change in activity at an ICP (represented by the change in Gross Customer Orders [at LAC]), an *independent* management and materiel cost change can be computed. To compute this change, a baseline time period is selected and each of these three elements and the change from this baseline is computed in each subsequent period. (The period can be a month, quarter, or year, and is determined more on data availability than on any other issue.) Comparing the independent change to that of the Gross Customer Orders will highlight independently efficiencies or inefficiencies in both management costs and materiel costs.

Most data to support this area are available in existing documents. The management costs and materiel costs may be extracted from budget documents. The

"Gross Customer Order (at LAC)" data is being computed as a metric itself; therefore, no additional data requirements will be placed on the Services or agencies unless a less-than-annual reporting cycle is placed on the reporting elements.

We recommend computing the proposed metrics at an ICP level. The minimal effort required to compute these metrics will be more than offset by the additional insights possible.

9. Percentage of ICP Supplier Items Filled On-Time (Excludes PV/DVD [Planned])

This metric, in isolation, provides important information to ICP managers about performance of their suppliers. In fact, similar information is being gathered at the ICP level at all the Services and agencies. The information is used in a slightly different manner to evaluate suppliers today. The proposed metric, in concert with primarily one other proposed metric, will provide ICP managers with a thorough understanding of commercial suppliers' performance. In concert, this proposed metric and the metric, "Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD (planned) Shipments During a Specified Period)," will capture the timeliness of all commercial shipments.

In addition, these metrics provide supplementary information to the metric, "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)." These metrics examined simultaneously provide a high-level view of the supply chain elements meeting required timelines. A trend analysis may highlight an underlying common problem causing delays throughout the supply chain.

The proposed metric enters a new dimension of the supply chain. Before, the metrics focused primarily on the ICP-customer interface. This proposed metric moves more into the supplier-ICP interface. In other metrics, the data focus was on shipments or information involving the field customer. This metric is primarily, but not exclusively, focused on the shipments to the DoD distribution depots. It is important to note that this data is outside the more commonly known materiel management information systems at an ICP.

The information above has highlighted a primary hurdle for computing this metric. The data reflecting on-time shipments to customers from a commercial supplier can be captured in the LMARS LRT file; however, the on-time shipments to the DoD distribution depots are more difficult. Although data is collected by each ICP to evaluate supplier performance, this data is not collected in a common format or by a common information system. DLA has a common system for its ICPs; however, the Services' ICPs do not use this system, or necessarily a common system among the ICPs of a Service. In addition, the data is being compiled on a shipment basis. To be consistent with other proposed metrics, data should be collected on a per-item versus a per-shipment basis.

It is not currently feasible to capture the data consistently between the Services and agencies; however, the effort to capture this data, and subsequently compute the proposed metric, may not be significant. This would require a review of the individual ICP systems and an evaluation of the effort required to consistently capture the required data. Based on the evaluation, a comparison of the value of the metric with the effort to collect the data could be performed. In addition, the need to develop a single or common DoD system to capture this data should at least be examined.

SUCCESS FACTOR: REDUCE EXCESS CAPACITY

10. Warehouse Utilization

Warehouse operations are not controlled by the ICP; however, the utilization of the warehouses is highly dependent on ICP decisions. More specifically, the decision to stock items in a DoD warehouse versus allowing the private sector to store items (i.e., PV/DVD) is an ICP decision. By increasing the amount of private sector supply support, the DoD warehouse usage can decrease. This would then force the fixed costs associated with the warehouse function to be distributed over a smaller inventory. Hence, the per-unit cost to store items in DoD facilities may increase. Although the ICP decisions are a major driver of warehouse utilization, the warehouse management also can effect warehouse utilization independent of the ICP decisions.

The primary purpose of this metric is to provide an indicator that will assist ICP managers and other senior logistics managers in explaining changing warehousing costs. In a more proactive role, this indicator may provide ICP management with the information that will aid in projecting the full impact of increased private sector support. In addition, it will provide data that can support analyses of future warehouse requirements. Capacity utilization is a common commercial metric; therefore, commercial baseline data should be readily available for comparative analyses.

The increased use of private sector support for DoD is, at least initially, primarily for secondary items. Therefore, the focus of this metric should be the covered storage areas maintained by the Defense Logistics Agency Distribution Depot Command, where most wholesale secondary items are maintained. Utilization data is recorded on a quarterly basis for DLA (and semiannually for the Service depots); therefore, no new data reporting requirements are necessary. This data has been reported in the past, so data for trend analysis would be available, if desired.

We recommend that this metric be reported for DLA warehouses using cubic feet. We also recommended that the DLA Distribution Depot Command be consulted for alternative units of measure. If an alternative is offered, data availability should be evaluated at that time. Service depots should be excluded, at least ini-

tially. If Service warehouse data is desired for another purpose, it should be reported separately so as not to mask the effect of increased commercial support on secondary item storage requirements.

11. Gross Customer Orders (at LAC)

A major role of the ICP leadership is to be prepared for future demands, both near-term and distant. Most of the metrics discussed are focused more on specific aspects of an ICP's function. This proposed metric is focused more on planning and less on performance because the ICP has little or no control over customer activity and the demands placed on the ICP.

The operational customers now control a larger percentage of funds provided to the working capital funds than in the past. Examining the activity of the customers, which may indicate their tendencies to use existing or evolving commercial alternatives, allows the ICP leadership to better adapt their procedures and their workforce to handle these changes. This metric is an attempt to capture this information at the highest level of aggregation.

To capture customers' activity changes and to avoid other factors masking them, we selected "Gross Customer Orders," which we believe more accurately reflects the desired activity than "Gross Customer Sales." Sales are influenced by stock availability, or more accurately, stock non-availability. "Gross Customer Orders" evaluated at LAC is believed to be better than that evaluated at standard price because the surcharge influence is removed. An increase in the surcharge could lead to the conclusion that the activity level has increased when in fact it may have decreased.

Data for "Gross Customer Orders" are readily available in Service and agency budget materials, but is evaluated at standard price. Only sales data is commonly reported at LAC. Therefore, two alternatives were possible: (1) use "Gross Customer Orders (at standard price)"; or (2) estimate the "Gross Customer Orders (at LAC)." The recovery factor (or surcharge) can fluctuate significantly over time, and these changes could mask the true underlying customer activity. Therefore, we selected the second alternative.

By estimating a "composite" recovery factor, by ICP (because several ICPs manage multiple commodities with differing recovery factors), the recovery factor could be factored out of "Gross Customer Orders (at standard price)" and an estimate of the "Gross Customer Orders (at LAC)" could be developed. Although it will be an estimate of the sales at the latest acquisition cost, this method would still allow the underlying customer activity changes to be captured.

This will require ICPs to provide this data because DoD does not necessarily have all the data needed to develop the composite recovery rate by ICP. Therefore, this metric will require support from the ICPs; however, we expect the level of effort to be minimal. The potential value of this metric outweighs the small added com-

putational requirement; therefore, we recommend that this be a metric reported at the ICP level of detail.

SUCCESS FACTOR: IMPROVE INVENTORY EFFICIENCY

12. Organic Inventory Turns

Inventory Turns is a common DoD metric; however, in today's changing environment, its definition may require changing or an alternative measure may need to be examined.

The traditional "Inventory Turns," as defined in a past DoD strategic logistics plan, was the quotient of Gross Sales (at LAC) over "Average Asset Inventory" (excluding war reserves). Gross sales, as used in the inventory turns computation, would include sales from organic inventory (i.e., inventory in DoD storage sites) as well as that delivered directly to the customer from the supplier (i.e., PV/DVD). As reliance on the private sector increases, sales may remain constant; however, the amount of inventory being shipped from DoD depots could decrease. Even under this scenario, the computed "Inventory Turns" could remain constant while in reality, inventory is remaining in the DoD warehouse longer.

Other scenarios can be found that support reviewing the traditional "Inventory Turns" metric. The proposed metric, "Organic Inventory Turns," focuses the manager's attention solely on the inventory in the DoD depots and the sales from these depots. By monitoring this proposed metric, the ICP manager will be provided insights into the velocity of the DoD inventory that is not masked by other factors, such as the PV/DVD programs.

To compute the desired metric, the gross sales data from only the DoD supply depots are desired. This data element is not available in existing reports; however, it may be computed from the LMARS data. By capturing those records reflecting shipments (i.e., sales) from the DoD depots and then applying the unit price to the quantity, the sales, at standard price, may be computed. The denominator, the "Average Asset Value" (which excludes war reserves) has traditionally been displayed at LAC. However, this value, evaluated at standard price, is available in the Central Secondary Item Stratification Report (the "STRAT").

The result of these numbers will provide the ICP management a more realistic view of the velocity of the organic inventory while removing the impact of changing PV/DVD sales volumes and policies. This may be achieved with minimal additional effort at the Service/agency level. Therefore, we recommend the metric be considered for reporting at the Service/agency level.

13. Weighted Supply Availability

"Supply Availability," a metric we will discuss later, is frequently classified as a customer satisfaction measure; however, this is not necessarily a valid classification. "Supply Availability," as presently computed, represents that percentage of customer requisitions filled "immediately" from on-hand stocks. If all items were stocked items (at DoD warehouses), "Supply Availability" should be highly correlated to customer satisfaction; however, this is not necessarily the case now and is increasingly becoming more incorrect as more items are supported directly by commercial suppliers (i.e., PV/DVD).

"Weighted Supply Availability," an alternative, would capture the percentage of customer requisitions filled "immediately," regardless of source of supply (i.e., stocked, non-stocked, and PV/DVD). PV/DVD supported requisitions are important to capture because its use has grown significantly and is expected to grow even more in the future. A more comprehensive measure of customer satisfaction would capture all threes sources of supply, which was the intent of the proposed metric.

Although the traditional "Supply Availability" data was found to be readily available, this was not the case for the nonstocked and PV/DVD items. We started to review the LMARS data to determine if, with additional computational routines, the data could be captured. During this research, we concluded that the proposed metric would be redundant with the metric "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)." From a customer perspective, an "immediate" fill of a requisition is not as relevant as receiving the materials by the customer's RDD. In other words, an "immediate" fill does not ensure the customer receives the material by the RDD, the true measure of customer satisfaction.

On reviewing the family of metrics, computing "Weighted Supply Availability" would not add significant value and would require additional data processing. Based on the criteria set for this research that included attempting to minimize additional data requirements and manipulation, the conclusion was that the value-added of this metric to the ICP managers in comparison to the effort required to compute the metric was not sufficient to warrant recommending "Weighted Supply Availability" for examination.

14. Percentage of Customer Returns Due to ICP Errors

Customers return material for many reasons, one of which is that the items received are not the items ordered. This error, as well as others, are examples that the ICP has incorrectly directed that items be shipped to the customer. Any error increases costs; however, the ICP can attempt to reduce only errors that they control. The ICP cannot, and should not, be held responsible for errors caused by the customer ordering an incorrect item or quantity of an item. Therefore, for a metric

to be valuable to the ICP management, it should focus on those areas under control of the ICP.

Such a metric is not feasible at this time. As has been found in previous attempts in other efforts relating to measuring or capturing quality of service information, data is the dominant constraint. This is again the case. Capturing any data associated with returns has been a problem. Trying to focus on specific reasons for such a return is even more difficult.

DLA has implemented a program that allows customers to report errors; however, it requires access to a specific program and not all customers have such access. In an attempt to capture as much feedback as possible, DLA allows input through an alternate system over the World Wide Web. However, to be useful for computing a metric such as that proposed, the data collected on the two systems must be merged. Each system allows the customer to use codes to identify the source of "error;" however, it was not clear that these codes were consistent between the two systems. Therefore, further research would be required to determine the ease in which the two systems' data could be merged.

This research did not locate similar systems at the service ICP level. Even if available, for a consistent metric across the service and DLA ICPs, a consistent data collection method should be in place. Such a common method was not located.

Although this is still an area that is believed to be important, the information systems and consistent data collect methods are not in place to support a metric at this time. We recommend evaluating the effort necessary to develop a consistent data collection method with respect to the value of the metric to the decision-maker. After such an evaluation, the senior decision-makers must determine if the value added by the metric supports the cost of data collection.

15. Percentage of Inapplicable Orders (Secondary Items)

Insufficient resources are available to procure all items required by an ICP. In addition, efforts have been underway for several years to use our inventory resources more effectively. These efforts are partially focused on reducing the resources tied up in, and for the maintenance of, inventory. The proposed "Percentage of Inapplicable Orders (Secondary Items)" metric highlights aspects of all of the above areas. The actions that attempt to reduce inapplicable orders will attack all of these areas simultaneously.

Inapplicable inventory is that inventory on order, defined as those assets the ICP has decided to procure but not yet contracted (i.e., committed) and those assets on contract (i.e., contracted) that are in excess of the requirements objective for an item. This situation occurs primarily when requirements are reduced or removed and the ICP continues to place contracts for these items or not cancel existing contracts.

This problem ties up a significant portion of secondary item procurement dollars. At the end of FY97, approximately 17 percent, or $1.5 billion of $9.0 billion procurement actions, were to procure inapplicable inventory. Reducing this problem can quickly free significant dollar resources to procure more critical items; however, it will require action by both the customers and the ICP.

The primary drivers of this measure are not fully under the control of the ICP. Changing requirements are placed on the ICP; the ICP can only react. However, the ICP can make procedural improvements to reduce the impact of the changing requirements. The Navy has demonstrated this and has significantly reduced its inapplicable inventory. The primary focus of this metric is to highlight the improvements the ICP can implement to react to changing requirements. However, this data can also be used, in aggregate, to highlight to the customers their impact on the scarce procurement resources available to the ICP.

Data is available to support identification of inapplicable inventory for all services and agencies, at the aggregate level, in existing reports available to the OSD leadership. Only the Air Force data is not available at the ICP level external to the service. Therefore, no new data requirements would be added, with the possible exception of the Air Force, to review this metric at an ICP level of detail.

The magnitude of this problem and the potential for freeing critical resources supports our recommendation that this be a reported metric. Data at the ICP level is available for all but the Air Force; therefore, we recommend that the level of detail be the ICP. We recommend that the Air Force evaluate the level of effort to collect and report the data at a similar level.

16. Supply Availability

Supply availability is one of the most common metrics quoted in DoD and possibly one of the least understood. Sometimes it is inappropriately stated as a customer satisfaction index because the metric is computed only for stocked items. Therefore, if a customer orders a non-stocked item and does not receive it, the customer is not satisfied; however, the metric value is not reduced because of this unfilled order.

Supply availability, as currently computed, is an ICP performance metric for a *subset* of the items managed. The metric provides the ICP management with an indicator of the success of focusing scarce resources on those items being demanded by the customers as well as an indicator of the underlying forecast methodology accuracy. This metric also provides the ICP with an indicator of its success in reducing inventory levels without affecting its support to the customer, for at least a subset of the managed items. A major area of concern with this metric is that it can be manipulated by the ICP by moving items that are in an out-of-stock position to a nonstocked category to avoid being penalized for being out-of-stock.

Data is reported in the Service and DLA BES documents. This would indicate that data are available, at a minimum, annually; however, it is not clear that the components consistently compute these reported values. The data was reported in the MILSTEP reports (Supply Availability and Workload Analysis Report). Because a single data source was used, it was believed that the values were computed consistently; however, these reports are no longer published.

This metric is more valuable to the ICP managers than to the senior DoD leadership. It is believed to provide valuable information concerning the trade-offs of reducing inventory and customer satisfaction, even though it is only a partial view of supply availability from the customer perspective. Other potential metrics, "Weighted Supply Availability" and "Percentage of Items Filled On Time (for Customer Receipts During a Specified Period)," potentially will assist in providing added information from the customer perspective.

It is recommended that this metric be reported, at the ICP level. This data is available, but not in the documents provided to the OSD level. It is also recommended that the components' computation methodology be compared and a single consistent methodology be developed, if the current methodologies are not consistent.

SUCCESS FACTOR: INCREASED USE OF TECHNOLOGY

This success factor is unique in relation to other areas in this analysis. Technology advances not only have altered the way inventory is managed in the DoD supply chain, but also the data that may be used to evaluate these changes. Continual technology advances improve performance but simultaneously increase the number of new areas for which advances require measures. In addition, as new information systems and processes come into use, the number of potential legacy systems increases. The combination of these potential events form the background for the analysis in this area.

The ICPs have undertaken numerous technology-based initiatives to improve how they do business. As result, new goals, objectives, and corresponding methods to provide better support to the customer dependent on this new technology have become part of the strategic objectives in DoD. New technologies are being introduced that not only replace existing technologies, but also to complement what already exists. Consequently, data requirements under these dynamic circumstances may also change. Moreover in some cases, it is not always clear what data are currently being collected, and some data simply does not exist in an easily accessible form, or at all.

The other success factors for which we developed proposed metrics generally lend themselves to metric development because the supply functions that we had to examine, and the problems that the metrics addressed, have existed for years. Standards for these long-standing functions and systems sometimes can be modified more readily at the margin to adapt to changes in plans and requirements.

Consequently, data requirements for supporting the earlier proposed metrics have a greater likelihood of being met.

For example, "Gross Customer Orders (at LAC)," a metric for the success factor "Reduce Excess Capacity," is a concept for which data are probably more readily available for its calculation. On the other hand, metrics for the success factor, "Increased Use of Technology," focusing on electronic commerce and total asset visibility, are relatively new concepts. Frequently, we found no existing metrics. In other cases, the technology advances had expanded the capability of the information systems to the point that the systems had been adapted to assist in nontraditional areas. Thus, data availability for this success factor is a major challenge.

17. Percentage of Redundant Requisitions

Redundancy is sometimes necessary or desirable. Many systems, particularly those where human safety and survivability are at stake, are designed with elements of redundancy. On the other hand, redundancy at the expense of the customer should be avoided in most cases. ICPs strive for customer satisfaction; however, when the customer perceives the need to submit redundant requisitions, one can reasonably assume that some degree of dissatisfaction with the ICP's process is present.

In an ideal world of joint total asset visibility, redundant requisitions should not be necessary. Assuming that the user queries the system properly and it functions as required, the customer should have to submit a requisition only one time. In reality, however, the system is likely to function less than 100 percent of the time because of human or nonhuman errors. Therefore, to the extent that redundant requisitions potentially have negative effects on mission effectiveness, their frequency should be identified and reported to senior managers.

The proposed metric, in conjunction with the metric to be discussed next, are linked directly to the evolving Joint Total Asset Visibility (JTAV) system. Initially, the Total Asset Visibility system (TAV) focused solely on material assets and the proposed metric was recommended based on this understanding. However, TAV has evolved to JTAV, which has a much broader projected role, well beyond just tracking hardware assets. Currently links to existing information systems capture personnel information, an area not originally believed to be part of the TAV program.

This analysis found that JTAV is one of the evolving systems noted in the preceding general discussion. The current degree and level of implementation of JTAV is not consistent throughout DoD; however, progress both in breadth and depth of coverage continues under the supervision of a single office, the JTAV Office (JTAVO). Because of the evolutionary nature of JTAV, we decided it was not in the best interest of DoD to attempt to capture the proposed metric. Although JTAV can and will continue to allow more insight into stock availability

questions and, therefore, reduce redundant requisitions, it may be inappropriate, at this time, to focus solely on this particular metric. One reason for this conclusion was that measuring progress in the material asset visibility aspect of the problem may cause managers to focus an improper amount of their development effort on this, ignoring other equally important areas. A metric that supports a more balanced development of JTAV may be more appropriate.

In addition, the JTAVO is beginning to examine a performance system including metrics and data collection requirements. After discovering the breadth of JTAV and its evolutionary nature, we recommend that a single analysis effort coordinated by or through the JTAVO would be more cost effective in refining the proposed metric and investigating potential data sources. This will allow the metric to reflect the underlying desires of senior leadership with respect to the balance in the functional evolution of JTAV.

18. Percentage of Total Asset Visibility and Accessibility Achieved

Our Services' deployment experiences during the early 1990s emphasized the need for increased visibility of assets in the supply chain. Consequently, the DoD established the goal of JTAV to improve the total performance of the DoD's logistics practices. More specifically, the JTAV program aims to develop a capability that provides timely and accurate information on the movement, status, and identity of units, personnel, equipment, and supplies.

JTAV is viewed from two customers' perspectives: the "factory" and the "foxhole." The factory includes DoD corporate users, wholesale business managers and personnel/item mangers who need JTAV to manage the business process more effectively. The foxhole has CINC commanders, J1s/J4s and warfighters who address matters of contingency planning, readiness and timely operational/mission support.

This discussion highlights the value of JTAV to many; however, it does not comment on what aspects of JTAV should be or are of greater priority than another. The percentage of total DoD material assets visible in JTAV initially appeared to be a reasonable metric; however, this was under the understanding that material assets were the sole, or at least the primary focus of JTAV. This analysis has highlighted the fact that other areas, such as personnel, are being captured by the evolving JTAV architecture; however, the priority of focus was not found.

As stated in the discussion for "Percentage of Redundant Requisitions," focusing on one area may cause resources to be taken from an equally important aspect. Therefore, as was recommended earlier, a single analysis effort coordinated by or through the JTAVO would most likely be more cost effective in refining this and the previous proposed metric. In addition, identifying the required data sources should be part of this single effort. This approach will again allow the metric to

reflect the underlying desires of the senior leadership with respect to the balance in the functional evolution of JTAV.

19. Percentage of Transactions Performed Electronically

This metric again highlights the difficulty of identifying a metric in an evolving area. To reduce reliance on paper, and its cost implications in terms of time, storage, and other resources, DoD strives to increase the volume of its business, both internally and externally, that is done electronically. The supply chain has been at the forefront of this initiative as various types of electronic tools encompass more and more of its business functions.

By taking advantage of the emphasis on electronics transactions, ICPs have implemented several tools to serve their customers better and interact with their suppliers more efficiently. The documentation that we saw in this study shows that some ICPs, and other elements in the supply chain that interact with them, are making advances in becoming compatible electronically. Therefore, it is appropriate to attempt to gauge the ICP community's efforts to be in harmony with the rest of the logistics community, both government and private suppliers, in using electronics transactions to conduct business.

Because of the desire to be proactive, individual ICPs frequently have independently developed systems to increase their capability to interact with suppliers in a paperless mode. This has led to numerous different systems, each with potentially a different specific focus. For example, document access and document workflow are areas that systems have been implemented; however, dependent on how "transactions" are defined, these efforts may or may not be recognized.

A single metric in this area may be too optimistic. Even if determined not too optimistic, data collection from numerous diverse systems will require an enormous effort. Therefore, for this specific area, additional research should be performed to determine the potential costs and value added of the proposed metric. If the costs are considered reasonable, an effort to define specifically the "transactions" should be undertaken. If the costs are too high in relation to the potential payoff, this metric should not be examined further.

Chapter 4
Summary

This report, using a structured analysis methodology and applying an accepted fundamental performance measurement tool (i.e., the Balanced Scorecard), identified 19 potential performance measures for the Supply Management Business Area of the DWCF. These metrics were categorized into six key success factor categories identified through a review of strategic DoD documents as being critical to achieving the strategic goals of DoD. Two additional perspectives, Supplier Performance and Employer Satisfaction, were added to the traditional Balanced Scorecard model based on a review of research that has been conducted since the development of the Balanced Scorecard.

The proposed metrics were a result of reviewing existing DoD and commercial metrics in the supply functional area. In many cases, new metrics were developed and presented as replacements for existing metrics. In other cases, new metrics were developed to focus on critical problems identified in DoD documents.

Each metric was then examined to identify both advantages and disadvantages, especially data availability. An underlying premise of this analysis effort was to minimize new data collection requirements; however, this was constantly balanced with the need to maximize the value and accuracy of the metric to the user, OSD senior leadership.

The result of the analysis was that 12 of the 19 metrics were recommended for implementation; however, in some cases caveats were added that highlighted the requirement to examine a specific aspect of implementation. For example, in a few cases, minor data processing routines would be required to implement the metric. The caveat stated that the effort to develop the data routine would have to be evaluated to ensure that its "cost" was warranted.

The Employee Satisfaction perspective was not emphasized in this analysis and no metrics were identified in this category. The primary reason for an absence in this area was guidance given by the sponsor early in the analysis that the success factor Improve Workforce would not be considered. Although not certain, a metric for Employee Satisfaction would have been identified for this success factor.

The appendix discusses each metric in detail, focusing primarily on identifying the specific data source for each metric. The appendix is important to those desiring more specific information on the data source and data manipulation required to capture data and compute the metric.

Appendix A
Metric Fact Sheets

The following section consists of individual fact sheets for each proposed metric. They are presented in the same sequence as they appear in Figure 3 (starting in the left column and reading top to bottom). This appendix contains most of the supporting information from the narrative presented earlier; however, more detailed information is provided with respect to data availability. The appendix is focused on documenting the underlying information required for complete evaluation and implementation.

1. Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)

***Definition*:** The total number of items filled on-time divided by the total number of items received by the customers during a specified period.

Perspective/Factor: Customer Satisfaction/Reduce LRT

Commercial Equivalent: "Delivery Performance to Customer-Request Date"

Purpose:

- This metric is intended to measure, or provide an indicator of, customer satisfaction with regard to the responsiveness of the logistics system to customer requirements.
- This supplements other metrics that focus on Customer Wait Time (CWT):
  - ➤ CWT, or similarly the Logistics Response Time (LRT), does not highlight the potential case where the system may be meeting *system* time goals (i.e., CWT) but failing to meet the *customers'* time requirements (i.e., Required Delivery Date [RDD]).
  - ➤ If the customers are not receiving the parts by their required date, from the customers' perspective, the system is failing.
  - ➤ In addition, if the customers are receiving the product on time, further reduction of CWT or LRT, from the customer perspective, is not required and management efforts should be focused elsewhere.
- This metric also can either complement or supplement metrics such as "ICP Processing Time" and "Weighted Source Cycle Time" to identify the potential source of problems, not all of which are necessarily under the control of the ICP, in meeting the customers' RDD.

Discussion:

This metric has evolved from "Percentage of Requisitions Filled On-Time" to "Percentage of Items Filled On-Time" (based on requisitions submitted) to the final recommendation being "Percentage of Items Filled On-Time" (for "Customer Receipts During a Specified Period").

The first change reflected a desire to highlight the fact that the ICP should receive credit for a partial fill. A counterpoint considered was that a partial fill may not be useful to the customer; however, one can argue that a partial fill may be valuable to the customer.

The final change was based on data availability. As will be discussed below, the Logistics Metrics Analysis Reporting System (LMARS) captures data from the Defense Automatic Addressing System (DAAS). A methodology already exists to identify completed transactions in LMARS. By using "completed shipments during a specified period" as the criterion (vice "requisitions during a period"), additional data routines to select records for further examination will not be necessary. In addition, the difficulty of handling requisitions/shipments placed in one period and filled in the next period, whether these shipments are on time or late, should be removed.

Pros:

- Complements metrics that do not emphasize timeliness of the supply system to the customer's requirements (e.g., LRT, CWT, etc.).
- Can be used by the Inventory Control Point (ICP), in conjunction with "ICP Processing Time" and "Weighted Source Cycle Time," to determine the degree to which non-ICP controlled factors are the cause of poor customer satisfaction.
- A similar metric, "Percentage On-Time Fill Rate" was being considered as alternative measure in GPRA.

Cons:

- Segments of the supply chain that are not in control of the ICP can cause the shipment not to meet the standard
  - ➤ Measuring and reporting an aspect of a process that the manager (i.e., the ICP) does not control is not normally the preferred metric.
  - ➤ In this case, the intent is to complement the metric with other metrics focusing on ICP controllable areas.
- Some requisitions are "outside" the normal information management systems and will be difficult to capture
  - ➤ Requisitions that are not processed by the DAAS, such as some medical prime vendor requisitions that are not submitted via DAAS, will be excluded due to data collection difficulties.
  - ➤ These exclusions could bias the reported measure since all customer requirements will not be captured.
- Metric does not distinguish between items filled from organic DoD distribution depots and those supported directly by commercial suppliers.

- Must determine a standard to be used (RDD or Uniform Materiel Movement and Issue Priority System [UMMIPS]) or some combination.

Data:

Discussion:

- Requisitions are delivered to ICPs from customers via DAAS.
  - ➤ LMARS receives its data from DAAS.
  - ➤ By using LMARS, all requisitions that are transmitted via DAAS will be captured.
  - ➤ Requisitions outside DAAS (i.e., requisitions transmitted via commercial vendors' software) will not be captured in LMARS.
- A routine already exists to identify and extract completed requisitions from the LRT file of LMARS.
  - ➤ The existence of this routine led to using completed shipments (i.e., customer receipts) instead of requisitions as the computation basis of the metric.
  - ➤ Only completed transactions would be analyzed for this metric.
- To determine if the requisition is filled on-time, one must have two data elements:
  - ➤ RDD of a requisition
    - This is the date the customer requires the material and can be filled in by the customer.
      - Current data shows that about 70 percent of requisitions (in the LMARS LRT file) have an RDD.
      - It was indicated that DAAS has been instructed in certain instances to place a default value in the RDD field if it was blank on submission; therefore, these dates may not reflect the true customer requirement.
    - If the RDD is filled in, the effective RDD will be lesser of the RDD or the UMMIPS standard added to the requisition date-of-birth.
      - The requisition date-of-birth is provided in the LMARS LRT file.

- If the RDD is not filled in, the UMMIPS standard applies and will be added to the requisition date-of-birth to identify the RDD.
- A simple table can be developed for the UMMIPS standards and is shown below
  - UMMIPS standards depend on:
    - Requisition priority group:
      - Card columns 26-27 LMARS LRT file contains the requisition priority.
      - This requisition priority can then be converted into one of three priority groups shown in the table below.
    - Requisitioning unit location:
      - LMARS has a Department of Defense Activity Address Code (DoDAAC) table that determines the location of shipment and fills in LRT file column 497 with a 0-5 numeric value.
      - Areas 1, 2, 3, and 4 are OCONUS locations.

The table below represents the values, in days, that would be added to the requisition date-of-birth to establish an RDD.

Table A-1. UMMIPS Standards

	Area				
Priority Group	CONUS	1	2	3	4
Priority Group 1	3.5	8.5	8.5	8.5	0.5
Priority Group 2	7.0	14.0	14.0	14.0	16.0
Priority Group 3	16.0	44.0	51.0	58.0	78.0

- The customer receipt-date is the date the customer submits an acknowledgement of receipt transaction (i.e., D6S, DRA or DRB transactions).
  - ➤ This is recorded in the LMARS LRT file in card columns 462-471.
- To determine if a requisition is filled "on-time," the customer receipt-date would be compared to the RDD.
  - ➤ If the customer receipt-date is greater than the RDD, the shipment is late.

- Otherwise, the shipment is on-time.

- The above only focuses on the data to determine if it was on time.
  - To determine the percentage on-time, the same data routine that computes the RDD and compares this to the customer receipt-date must also sum the quantity (card column 204-212 of the LMARS LRT file) for those complete shipments that were:
    - On-time (includes shipments received prior to the RDD)
    - Late
  - The sum of these two numbers will provide the denominator, while the on-time value will provide the numerator of the proposed metric.

Summary:

- All of the required data are available in LMARS LRT file:
  - Requisition date-of-birth
  - Requisition RDD, if filled in
  - Requisition priority
  - Requisitioning unit location (Continental U.S. [CONUS] or Outside Continental U.S. [OCONUS])
  - Customer receipt-date
- A data routine would be required to
  - Compare the computed RDD and the customer receipt-date.
  - Tally the number items on the on-time shipments and separately tally the number of items that were late.

Recommendation:

- Proceed with the proposed metric.
- Determine the level of effort to develop and implement the proposed additional data computation routines and make an evaluation based on this information.
- Using the requisition date-of-birth does not penalize the ICP for delays in the "retail" system; however, this "retail" delay will be seen by the customer and not reflected in the measure if implemented as described above.

- Alternatively, one could use the requisition serial-date, also available in the LMARS LRT file, in lieu of the requisition birth-date, to better capture the true customer perspective.

2. ICP Processing Time

Definition: Time elapsing between the date a requisition is received at an ICP and the date a Material Release Order (MRO) is transmitted or the requisition is passed to a vendor for DVD (planned and unplanned).

Perspective/Factor: Product/Service Quality/Reduce LRT

Commercial Equivalent: Similar to "Order entry complete to order ready for shipment time."

Purpose:

- This metric will capture the ICP-controlled portion of the DoD supply system response for a requisition to the wholesale system.
- It will provide the ICP managers the necessary data to evaluate a specific element of the total response time, specifically the element the ICP solely controls.
- The proposed metric will provide the basis for a drill-down capability that would allow the impact of management decisions (i.e., stocked versus Direct Vendor Delivery [DVD]) to be more fully evaluated.

Discussion:

Pros:

- Focuses on that segment of the supply chain response time for which the ICP has full responsibility.
- Has specific and identifiable start and stop events.
- Is an area that has been considered by some ICPs.
  - ➤ Defense Logistics Agency (DLA) already has (or had) a goal (1 day for immediate requisitions).

Cons:

- Gives only an indirect indication of on-time service since other elements of the supply system could fail.
- Will not capture some Prime Vendor (PV) requisitions that are not processed by Defense Automated Addressing System (DAAS).

Data:

Discussion:

- These data are currently captured and available in the LMARS.
  - ICP Process time is the third segment in LRT as measured by LMARS.
  - This segment measures the time from DAAS' release of a requisition to a wholesale ICP until DAAS' receipt of an issue transaction.
    - Issue transactions can be:
      - Materiel Release Order (MRO) [DIC-A5 transaction]
      - Direct Delivery Notice [DIC-AB transaction]
      - Supply Status transaction [DIC-AE] with BV in card column 65-66 of the original requisition, indicating direct vendor delivery.
    - These data are reported in five categories, by ICP, by priority group, and by delivery location:
      - Composite (or Total)
      - Stocked
      - Non-stocked
      - Backordered
      - DVD
    - DVD/PV requisitions that go directly to the vendor using a vendor-provided terminal are not captured in LMARS.
    - All DVD/PV requisitions that go through DAAS are captured in LMARS.

Summary:

- This metric is already reported as part of LMARS.
- Allows same data source, and, therefore, a single rule-base, to be used for all components.
- Data are already being collected

- ➤ No new data requirement is being created.
- ➤ No new data manipulation requirement is being requested.
  - Drill-down capability is already built into the data collection and reporting system.

Recommendation:

- ◆ "ICP Processing Time" be reported using LMARS data as source (and as a rule-set) realizing that not all requisitions (primarily Prime Vendor) are captured.

3. Weighted Source Cycle Time

Definition: Dollar-weighted time to obtain assets from new procurement and from repair (depot maintenance).

***Perspective/Factor*:** Supplier Performance/Reduce LRT

Commercial Equivalent: Similar to the Supply Chain Operations Reference (SCOR) model "Source Cycle Time."

Purpose:

- A major trade-off the ICP manager must consider is between cost and time.
- The ICP may be able to procure an item more rapidly, but it may increase the cost.
- The ICP may want to have a reparable item repaired versus buying it since the repair cost is lower; however, the repair time may be longer than the time to receive a new item.
  - ➤ The proposed metric will highlight the trade-offs of increased costs of an option (new procurement versus repair of an existing item) to that of the decreased time consideration of the decision.
    - This is applicable to both reparables and consumables.
      - Reparables primarily from a buy-versus-repair decision
      - Consumables primarily from a higher cost for faster delivery from the supplier.
    - This metric also supports the ICP in evaluating the responsiveness of the ICP suppliers with respect to their impact on CWT and LRT.

Discussion:

Pros:

- Captures the impact of the commercial sources, the DoD organic repair depots, as well as commercial repair facilities, on CWT.
- Captures, from the ICP perspective, an indication of lead-times to replenish ICP controlled stocks.
- Data is available annually at the service/agency level in the Budget Estimate Submission (BES).

- BES documentation includes ICP-level data for other than the Army.
- Army data, at ICP level, has historically been available on request.

Cons:

- There is no correct answer for this metric.
  - Lower is not necessarily better, if it increases total costs to the ICP.
  - Higher, if uncontrolled or uncompensated, will increase LRT.
- Data is available only annually.

Data:

Discussion:

- The potential components of this performance measure are:
  - For reparable items:
    - Supplier time is ALT + PLT, where ALT = administrative lead-time and PLT = production lead-time
    - Maintenance depot time is retrograde + repair cycle time.
  - Consumables
    - Supplier time is ALT + PLT
- Data availability is restricted to annual.
  - Depot Repair Cycle Time, Administrative Lead-Time (ALT), and Production Lead-Time (PLT) data are available at the ICP level in exhibit SM-3a of the BES.
  - These same data elements, at the ICP level of detail, are available on request from the services.
- It is assumed that depot repair cycle time, as reported in the BES, includes retrograde time representing the time to move an item to the repair facility.
- The numbers for each of the three time segments (i.e., ALT, PLT, repair cycle time) are reported both in days and dollars in the BES.
  - Days represent the average number of days worth of demand that are in that specific pipeline segment.

- ➤ Dollars represents the total value of that segment of the pipeline, either in terms of repair costs or contract costs.

- ◆ To develop the dollar-weighting factor, sum the dollar value of all three segments.

- ◆ The "Weighted Source Cycle Time" is the summation of days times dollars for each of the three segments divided by the summation of dollars across all segments.

- ◆ Exclude PV/DVD-supported items because the supplier has been paid to provide a level of service on an on-going basis (which is paying the supplier to have a set ALT+PLT+delivery time *to the customer, not the supply depot).*

Summary:

- ◆ Using the data from the BES and the methodology described above, a dollar-weighted cycle time can be developed.

- ◆ It is assumed that repair cycle time as reported in the BES includes retrograde wait time.

- ◆ It is also assumed that PV/DVD is excluded for the values reported in the BES.

Recommendation:

- ◆ Implement this metric immediately using ICP level data.

4. Standard Price Change Ratio (DoD/Private)

Definition: Average standard price change of DoD-controlled items compared to average standard price change of privately-supported items.

Perspective/Factor: Financial Performance/Leverage Private Sector

Commercial Equivalent: Related, but different than "Percent Change in Customer Price Compared to Inflation" discussed and recommended in the LMI report *Supply Chain Management: A Recommended Performance Measurement Scorecard*, June 1999.

Purpose:

- A common underlying driver associated with the movement to private sector support is that this will allow a total cost reduction to the government.
- This metric is to capture the long-term impacts of privatization decisions on the *total item cost* to the customer.
  - ICP management costs cannot be linked to specific items; therefore, ICP management costs cannot be separated into costs associated with management of DoD-controlled items versus privately supported items.
  - Material costs for DVD/PV items are not distinguishable from other costs (management, risk, etc.) born by the supporting contractor because the government pays only the total contract cost.
  - The financial environment is a revolving fund; therefore, all costs are eventually paid by the customer.
  - Therefore, the impact on item cost of migrating to increased private support may be captured by focusing on the item cost to the customer.

Discussion:

General:

- The original concept for this metric was:
  - A price change could be captured for items that have recently transitioned from DoD-control to private-sector control.
    - Capture those items that have migrated and been under private-sector support for no more than X years.

- Compute the price change based on its current price and that when it was DoD-controlled.

➤ The above price change would be compared to the price change for those items that have been and remain DoD-controlled items.

➤ Both of the above prices would be "standard price," which is the item cost to the customer.

➤ By comparing these price changes, one could see the impact, on item cost to the customer, of migrating items from DoD to private control.

Pros:

◆ Captures the price trend of items leaving DoD control and compares it to a baseline.

➤ Allows comparison of the two sectors (DoD-controlled versus privately-supported items) to evaluate the cost benefit of privatization.

◆ By examining the change in item price, not the volume of sales, demand trends do not distort the results.

◆ Inflation should affect the two price changes similarly, thereby "washing out" in the computed ratio.

◆ Metric would indicate potential impacts of continued movement of items to private-control.

➤ If too many items move to privately-controlled items, the fixed costs allocated to the DoD items may become excessive, causing an increase in total costs.

Cons:

◆ Data collection could be a major problem.

➤ Identifying items that have migrated and also computing a change in price for these items requires access to historical data, not just current data.

Data:

Discussion:

◆ The step required to classify items as PV/DVD items is data intensive.

- ➤ It was learned that items may be Prime Vendor-supported in one area (i.e., West Coast) and are DoD stock supported in another area (i.e., the East Coast)—how do you classify this item?

- ➤ Some items that have been supported by DVD in the past have reverted back to a DoD-stocked item.

- ➤ Note that we are not only examining items that are procured during a period or that were requisitioned during a period, but all items in the DoD catalog.

- ◆ The DLA Office of Operations Research & Resource Analysis (DORRA) performed an analysis of PV/DVD items.

  - ➤ To make the classification into PV/DVD versus non-PV/DVD categories, a review of the contract files, by individual contract, was required.

  - ➤ Catalog data, such as the Acquisition Advice Code, was *necessary*, but not *sufficient* to identify an item as PV/DVD item.

- ◆ To support the proposed metric, each reporting period the following actions would be required:

  - ➤ To identify PV/DVD items (i.e., privately-controlled items):

    - ■ Current contract files would have to be processed each time the metric is evaluated to determine if an item was PV/DVD or DoD supported in the most current period.

    - ■ The current price of the item would have to be computed from the contract file.

    - ■ Next, one would have to determine if it had been historically PV/DVD supported.

    - ■ The historical price would have to be captured.

    - ■ Only those items that have and continue to meet the criteria are kept in the "item set."

  - ➤ To identify DoD controlled items:

    - ■ The same process that was described above would have to be repeated to identify the DoD-controlled items.

Summary:

- The above methodology was felt to be unacceptable because of the extensive data processing requirements.
- No acceptable alternatives were found.
  - ➤ One could capture the price change of a market basket of items (as discussed in the LMI report referenced above); however, this does not allow one to associate any cost change with a cause, be it a change in management method or any other reason.
  - ➤ All other ideas, as did the original concept, required a method to segregate items into PV/DVD or DoD controlled categories.

Recommendation:

- This metric should not be requested from the ICPs at this time.
- A method (i.e., rule-base) and recording mechanism (i.e., Acquisition Advice Code identifiers) should be considered for classifying items that are solely PV/DVD.
- The proposed metric should then be considered only after a consistent methodology is in place across the services and agencies for the identification of PV/DVD items.

5. Percentage of Gross Sales Delivered Directly from the Supplier to the User

Definition: Total gross sales delivered directly from the supplier to the user [implying all PV/DVD(planned), PV/DVD(unplanned), and PV/DVD(non-stocked)] divided by the total gross sales for a specified period.

Perspective/Factor: Financial Performance/Leverage Private Sector

Commercial Equivalent: None

Purpose:

- The proposed metric provides both ICP and DoD leadership information in two areas:
  - Provides an indicator on trends of the ICPs toward "leveraging the private sector" (i.e., increased use of PV/DVD).
  - It highlights the potential changes in workload at the DoD distribution depots due to ICP decisions to increase private sector support.
- This metric should be considered in conjunction with:
  - "Warehouse Utilization"
    - One would expect that as the percentage of gross sales bypassing organic DoD distribution depots increases that warehouse utilization would decrease, all other factors being constant.
    - As this percentage increases, one might also see an increase in the per-unit storage costs.
  - "Percentage of Total Gross Sales for PV/DVD(planned) Items"
    - The difference between this metric (i.e., "Percentage of Total Gross Sales Delivered Directly from the Supplier to the User") and the "Percentage of Total Gross Sales for PV/DVD(planned) Items" will provide information on the magnitude of PV/DVD(unplanned) and PV/DVD(non-stocked) shipments to customers (in terms of dollars, not requisitions).

Discussion:

Pros:

- Captures all cases [i.e., PV/DVD (planned, unplanned, and non-stocked) shipments] where DoD warehouses are not used.
- Allows total impact on warehouse workload to be reviewed.
- Complements "Percentage of Total Gross Sales for PV/DVD(planned) Items" so inferences on magnitude of gross sales that are PV/DVD(unplanned) and PV/DVD(non-stocked) can be estimated.

Cons:

- Metric does not distinguish PV/DVD(planned) annual sales from PV/DVD (unplanned) and PV/DVD(non-stocked) dollars sales.
- Focuses on warehouse workload impact; an area not under ICP direct authority.
- To compute, must segregate shipments of PV/DVD (unplanned) into those shipments to the user and those to the warehouse for a single purchase.

Data:

Discussion:

- For the proposed metric, we want to capture the gross sales of only those items shipped directly from the commercial suppliers to the customer.
  - ➤ This data was not found to be directly available in any source.
  - ➤ This is similar to a problem encountered in computing the "Organic Inventory Turns" discussed later in this document.
- An alternative method has been found, but it is an approximation to the answer desired.
  - ➤ As discussed in the "ICP Processing Time" metric discussion, the LMARS captures requisition data from the DAAS.
  - ➤ LMARS has a file called the LRT file and a data routine already exists to extract completed shipments (i.e., delivered to the requisitioner).
    - Gross Sales for PV/DVD(planned), PV/DVD(unplanned), and PV/DVD(non-stocked) may be computed by evaluating specific shipment records in the LMARS LRT file.

- LMARS records reflect the item (i.e., the NSN) and the quantity shipped.

- Gross sales (at standard price) may be computed by multiplying the quantity shipped times the unit standard price.

- This would require additional data routines to compute this gross sales number and the data routine must have to access to the item standard price.

  - Standard price is contained in the DoD catalog, Defense Logistic Information System (DLIS).

  - DLIS contains both NSN and part numbered items.

- Only those records for shipments in the above categories should be manipulated.

  - PV/DVD(planned) are identified by a "B" in card column 166 of the LRT file.

  - PV/DVD(unplanned) are identified by a "D" in card column 166 of the LRT file.

  - PV/DVD(non-stocked) are identified by a "E" in card column 166 of the LRT file.

- Gross sales, at standard price, is available in the BES (SM 4 form) and represents the Total Gross Sales for a year, by ICP.

- By dividing the total of the gross sales for the three above categories by the Total Gross Sales (from the BES), percentage of total sales going directly to the customer would be approximated.

  - This is an approximation since the BES Total Gross Sales may not coincide exactly with the shipments completed (the data from LMARS) due to a time lag of shipment (i.e., sale by the ICP) and the completion of the shipment.

Summary:

- A data routine, that is required also for another proposed metric, will be required to evaluate the LMARs records denoting shipments of PV/DVD(planned), PV/DVD(unplanned), PV/DVD(non-stocked). This will provide the gross sales not passing through organic DoD depots and would be the numerator of the metric.

- Total Gross Sales data is available, at a minimum, annually (i.e., the BES) at the ICP level for all but the Army.

  ➤ The Army would have to provide the ICP level data separately.

- The metric may be computed using the gross sales (at standard price) available in the BES as a divisor.

Recommendation:

- The data routine to compute gross sales in the three categories (i.e., PV/DVD(planned), PV/DVD(unplanned), and PV/DVD(non-stocked)) may be centralized and add no burden to the services/agencies.

- Recommend that the effort to develop this data routine be explored and considered for implementation.

- If the effort to implement is acceptable, recommend this metric be reported at an ICP level of detail.

6. Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD(planned) Shipments During a Specified Period)

Definition: The total number of items filled on-time by PV/DVD (planned) shipments divided by the all items received by customers by PV/DVD (planned) shipments during a specified period.

Perspective/Factor: Customer Satisfaction/Leverage Private Sector

Commercial Equivalent: A subset of "Delivery Performance to Customer-Request Date"

Purpose:

- Supplements the metric "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)."
  - The metric "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)" does not distinguish between timely support from DoD stocks and those items supported by PV/DVD (planned) shipments.
    - This metric will allow the ICP manager to focus on the customer performance perspective of those items the ICP has selected for PV/DVD support.
    - Discrepancies between these supplementary metrics will highlight problems in other than PV/DVD(planned) shipments.
- The ICP could, with additional data, perform analysis on the types of items (e.g., commodities) that are more apt to be better served by PV/DVD than organic DoD support.

Discussion:

General:

This metric has evolved from "Percentage of PV/DVD Requisitions Filled On-Time" to "Percentage of PV/DVD(planned) Items Filled On-Time" to the final recommendation being "Percentage of Items Filled On-Time(for Customer Receipts by PV/DVD(planned) Shipments During a Specified Period)."

The objective for this metric was to supplement the metric "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)," which describes all customer receipts (i.e., requisitions). This proposed metric highlights one subset of all receipts; those shipments for items the ICPs have selected for the ICPs' customer to be supplied directly from the supplier. Although initially it was planned to be counted on the basis of requisitions, an on-time item fill basis was

selected to coincide with the supplementary metric. Also data availability through LMARS supported the item-filled basis.

As discussed earlier in reference to another metric, the LMARS captures data from the DAAS. A methodology already exists to identify completed transactions in LMARS. By using "completed shipments during a period" as the criteria (vice "requisitioned during a period"), additional data routines to select records for further examination will not be necessary. In addition, the difficulty of handling requisitions/shipments placed in one period and filled in the next period, whether these shipments are on-time or late, should be removed.

Pros:

- Supplements an earlier metric capturing percentage of all requisitions meeting the customer's requirements.
  - ➤ Allows implicit comparison of DoD to privately-controlled items timeliness by comparison to other proposed metric.
- Could also be used as a form of overall PV/DVD supplier performance evaluation.

Cons:

- ICP does handle many DVD requisitions enroute to the commercial supplier; therefore, the ICP in its processes and the ICP's policies could be source of problem instead of the private firm.
- Capturing PV/DVD requisition data may be difficult since some requisitions flow through commercial channels.
- Must determine a standard to be used (RDD or UMMIPS) or some combination to determine "on-time" criteria.

Data:

Discussion:

- Requisitions are delivered to ICP's from customers via DAAS.
  - ➤ LMARS receives its data from DAAS.
  - ➤ By using LMARS, all requisitions that are transmitted via DAAS will be captured.
  - ➤ Requisitions outside DAAS (i.e., requisitions transmitted via commercial vendors' software) will not be captured in LMARS.

- A routine already exists to identify and extract completed requisitions from the LRT file of LMARS.
  - The existence of this routine led to using "completed shipments" instead of "requisitions placed" as the computation basis of the metric.
  - Only the completed transactions are to be analyzed for this metric.
- For this metric, evaluate only those records in the LRT file of LMARS that are coded as DVD(planned).
  - Card Column 166 of the LRT file is the CORP-FILL-TYPE.
  - In a 1-month sample, all records had appropriate codes in this column with approximately 24 percent being coded as "B."
  - "B" in this column represents DVD(planned) shipments.
  - By selecting "B" records, the correct subset of all completed requisitions can be captured.
- To determine if the requisition is filled on-time, two data elements are required:
- RDD of a requisition
  - This is the date the customer requires the material and can be filled in by the customer.
    - Current data shows that about 70 percent of requisitions (in the LMARS LRT file) have an RDD.
    - It was indicated that DAAS has been instructed in certain instances to place a default value in this field if it was blank on submission.
  - If the RDD is filled in, the effective RDD will be the lesser of the RDD or the UMMIPS standard added to the requisition date-of-birth.
    - The requisition date-of-birth is provided in the LMARS LRT file.
  - If the RDD is not filled in, the UMMIPS standard applies, and will be added to the requisition date-of-birth to identify the RDD.
    - A simple table can be developed for the UMMIPS standards and is shown below.
    - UMMIPS standards depend on:
      - Requisition priority group

- Card columns 26-27 LMARS LRT file contains the requisition priority.
- This requisition priority can then be converted into one of three priority groups shown in the table below.

– Requisitioning unit location

- LMARS has a DoDAAC table that determines the location of shipment and fills in LRT file column 497 with a 0-5 numeric value.
- Areas 1, 2, 3, and 4 are OCONUS locations.

■ The table below represents the values, in days, that would be added to the requisition date-of-birth to establish an RDD

Table A-2. UMMIPS Standards

	Area				
Priority Group	CONUS	1	2	3	4
Priority Group 1	3.5	8.5	8.5	8.5	0.5
Priority Group 2	7.0	14.0	14.0	14.0	16.0
Priority Group 3	16.0	44.0	51.0	58.0	78.0

■ The customer receipt-date is the date the customer submits an acknowledgement of receipt transaction (i.e., D6S, DRA, or DRB transaction).

- This is recorded in the LMARS LRT file in card columns 462-471

◆ To determine if a requisition is filled "on-time" the customer receipt-date would be compared to the RDD.

➤ If the customer receipt-date is greater than the RDD, the shipment is late.

➤ Otherwise, the shipment is on-time.

◆ The above focuses only on the data to determine if it was on time.

➤ To determine the percentage on-time, the same data routine that computes the RDD and compares this to the customer receipt-date must also sum the quantity (card column 204-212 of the LMARS LRT file) for those completed shipments that were:

- On-time
- Late

➤ The sum of these two numbers will provide the denominator, while the on-time value will provide the numerator of the proposed metric.

Summary:

◆ All of the required data are available in LMARS LRT file:

➤ Requisition date-of-birth

➤ Requisition RDD, if filled in

➤ Requisition priority

➤ Requisitioning unit location (CONUS or OCONUS)

➤ Customer receipt-date

➤ Corp-Fill-Type (if "B," DVD(planned))

◆ A data routine would be required to

➤ Select the records corresponding to DVD(planned) shipments

➤ Make the comparison of the computed RDD and the customer receipt-date

➤ Tally the number of items in the on-time shipments and separately tally the number of items that were late.

Recommendation:

◆ Proceed with the proposed metric.

◆ Determine the level of effort to develop and implement the proposed additional data computation routines and make an evaluation based on this information.

◆ Using the requisition date-of-birth does not penalize the ICP for delays in the "retail" system; however, this "retail" delay will be seen by the customer and not reflected in the measure if implemented as described above.

➤ Alternatively, one could use the requisition serial-date, also available in the LMARS LRT file, in lieu of the requisition birth-date, to capture more of the true customer perspective.

7. Percentage of Total Gross Sales for PV/DVD(planned) Items

Definition: Total gross sales (at standard price) of PV/DVD (planned) sales divided by the total gross sale (at standard price).

Perspective/Factor: Operational Performance/Leverage Private Sector

Commercial Equivalent: None

Purpose:

- Metric will highlight to the ICP and senior DoD managers the level of *planned* dependence on the private sector for supply support.
- This metric, in conjunction with "Percentage of Gross Sales Delivered Directly from the Supplier to the User," will allow ICP managers full visibility of PV/DVD sales.
  - ➤ The difference between "Percentage of Gross Sales Delivered Directly from the Supplier to the User" and the proposed metric will be the percentage of sales supported directly by the commercial suppliers on an unplanned basis (i.e., PV/DVD(unplanned) and PV/DVD(non-stocked).

Discussion:

General:

- Total gross sales should be computed at standard price for this metric.
  - ➤ Items supported by PV/DVD price includes material, delivery, and management costs.
  - ➤ To remain on a "level playing field" for comparison, a similarly stated cost must be used for DoD stocked items.
  - ➤ Therefore, standard price versus latest acquisition cost (LAC) must be used.
- The proposed metric is weighted by item cost since using the number of National Stock Numbers (NSN's) in the PV/DVD arena to total NSNs managed gives no indication of the proportion of activity in the PV/DVD arena in comparison to the total workload.
- Bottom line: Sales, at standard price, is favored over the number of NSNs as the basis of measurement.

Pros:

- Provides a general indication of trend towards privatization
- When used with other metrics (i.e., "Percentage of Gross Sales Delivered Directly from the Supplier to the User"), a full picture of the PV/DVD dependence is captured.
- Reports information previously stated as a goal for DLA.

Cons:

- Provides no indication of change in performance (cost or responsiveness) of the supply system due to the change in percentage of PV/DVD(planned).
- Must be used with other metrics (e.g., "Percentage of Gross Sales Delivered Directly from the Supplier to the User") to provide a complete overview of the PV/DVD arena.
- Metric is weighted by the item unit cost.

Data:

Discussion:

- For the proposed metric, we want to capture a subset of the gross sales of those items shipped directly from the commercial suppliers to the customer.
  - ➤ This data was not found to be directly available in any source.
  - ➤ The value desired is a subset of that captured in the metric "Percentage of Gross Sales Delivered Directly from the Supplier to the User."
  - ➤ Therefore, the methodology similar to that used in capturing the "Percentage of Gross Sales Delivered Directly from the Supplier to the User" will be used.
- The proposed method is an approximation to the answer desired.
  - ➤ As discussed in the earlier metrics discussion, the LMARS captures requisition data from the DAAS.
  - ➤ LMARS has a file called the LRT file and a data routine already exists to extract completed shipments (i.e., delivered to the requisitioner).
    - Gross Sales for PV/DVD(planned) may be computed by evaluating specific shipment records in the LMARS LRT file.

- LMARS records reflect the item (i.e., the NSN) and the quantity shipped.
- Gross sales (at standard price) may be computed by multiplying the quantity shipped times the unit standard price.
- This will require additional data routines to compute this gross sales number and the data routine must have to access to the item standard price.
  - Standard price is contained in the DoD catalog, DLIS.
  - DLIS contains both NSN and part numbered items.
- Only those records for shipments for PV/DVD(planned) should be manipulated.
  - PV/DVD(planned) are identified by a "B" in card column 166 of the LRT file.

- Total Gross Sales, at standard price, is available in the BES (SM 4 form) and represents the Total Gross Sales for a year, by ICP.
- By dividing the gross sales for the PV/DVD (planned) records by the Total Gross Sales (from the BES), percentage of total sales going directly to the customer would be approximated.
  - This is an approximation since the BES Total Gross Sales may not coincide exactly with the shipments completed (the data from LMARS) due to a time lag of shipment (i.e., sale by the ICP) and the completion of the shipment.

Summary:

- A data routine, that is required also for another metric, will be required to evaluate the LMARs records denoting shipments for PV/DVD(planned) shipments. This will provide the PV/DVD(planned) gross sales value and would be the numerator of the metric.
- Total Gross Sales data is available, at a minimum, on an annual basis (i.e., the BES) at the ICP level for all but the Army.
  - ➤ The Army would have to provide the ICP level data separately.
- The metric may be computed using the Total Gross Sales (at standard price) available in the BES as a divisor.

Recommendation:

- The data routine to compute gross sales in the PV/DVD(planned) category may be centralized and add no burden to the services/agencies.
- Recommend that the effort to develop this data routine be explored and considered for implementation.
- If the effort to implement is acceptable, recommend this metric be reported at an ICP level of detail.

8a. Percentage of Management Cost Change Compared to Percentage of Gross Customer Order Change

and

8b. Percentage of Materiel Cost Change Compared to Percentage of Gross Customer Order Change

Definition:

Percentage management cost change is the cost of management in period *j*, the baseline period, subtracted from that of period *i* (the most current period) divided by the cost of management in the baseline period *j*.

Percentage materiel cost change is the cost of materiel in period *j*, the baseline period, subtracted from period *i* (the most current period) divided by the cost of materiel in the baseline period *j*.

Percentage "Gross Customer Order" change is the gross orders in period *j*, the baseline period, subtracted from that of period *i* (the most current period) divided by the gross orders in the baseline period *j*.

Both the management and material cost change percentages are then compared to the Gross Customer Order Change percentage to develop two ratios.

Perspective/Factor: Financial Performance/Utilize Best Value

Commercial Equivalent: None

Purpose:

- The purpose of this metric is to identify changes in management and material costs that do not match the change in activity and/or workload at an ICP.
- The proposed metrics will allow
  - ICP management to identify and/or track changes in the cost of management with respect to workload, an area that has historically been reviewed.
  - Increased visibility will provide ICP management a method to track their largest cost, materiel, with respect to activity level.

- This pair of metrics is proposed to replace, or at a minimum supplement, a metric "Cost of Operations to Materiel Costs" ratio proposed by some services and agencies.

Discussion:

General:

The above pair of metrics will allow continued focus on the historical management cost aspect of ICP operations; however, added focus will be placed on the cost of materiel. Materiel costs are approximately 73 percent of an ICP's expenses and therefore are such a major part of the costs, they should be at least monitored, if not scrutinized, as are ICP operations costs. The impact of minor improvements in reducing materiel costs (i.e., discounts for fast payment) may more than offset a corresponding increase in ICP operations costs. A 1-percent decrease in materiel costs is equivalent to a 3-percent change in management costs.

This pair of metrics is proposed to replace, or at a minimum, supplement a metric of "Cost of Operations to Materiel Costs" ratio proposed by some services and agencies. The Cost of Operations to Materiel Cost" ratio can be misleading. As more items become commercially supported (i.e., PV/DVD), the management costs for an ICP could decrease while the materiel costs increase since the costs associated with the management of the commercial item will be imbedded in the materiel costs. This could cause a decrease in the "Cost of Operations to Cost of Materiel" ratio indicating an improvement; however, nothing has necessarily changed except the method of management. No cost efficiencies have been gained.

These proposed percentage changes will be compared to the changes in gross customer demand (i.e., orders) on the ICP as a benchmark of relative activity at the ICP. If management costs *increase* (as a percentage) more than the gross customer demand (as a percentage), this would indicate a potential *decrease* in management efficiency. If management costs *decrease* (as a percentage) more than the gross customer demand (as a percentage), this would indicate a potential *increase* in management efficiency. Similar statements can be made for the materiel aspect of this metric.

Pros:

- Improves on the "Cost of Operations to Materiel Costs" ratio
  - ➤ Changes in customer demands are accounted in the proposed metric whereas in this metric, misleading output was possible.
- Allows historic management cost perspective to still be highlighted but emphasizes opportunities for materiel cost reductions.

- Data requirements are minimal assuming "Gross Customer Orders" metric is computed as discussed later in this document.

Cons:

- Must identify exact elements to be included in management cost (as will be the case in any metrics involving management costs).
- Additional analysis will be required to fully understand the impact of PV/DVD changes on these metrics in all environments (constant, increasing, and decreasing demand).
- Requires "Gross Customer Orders" data (at LAC) to be captured.
- Requires historical data to be maintained as a reference point for all three aspects involved.
  - ➤ Management cost
  - ➤ Materiel costs
  - ➤ Gross Customer Orders.

Data:

Discussion:

- Data required for the management cost and materiel cost change are available in the BES documents, currently reported on the SM-5a form.
  - ➤ The cost of management would be those costs that comprise the "Total Surcharge" costs.
  - ➤ The cost of materiels would be the "Sales at LAC/LRC."
  - ➤ This data is available, at a minimum, on an annual basis in the BES. It is reported at the service or agency level in the BES, but is available at the ICP level of detail, at least on an annual basis. It may be available on a more frequent basis, but this was not determined for all services.
  - ➤ The "Gross Customer Orders" data will be computed as part of a separate metric and therefore is available.

Summary:

- Data is available at service level in the BES and available at ICP level from the services/agencies.
- No new data collection is required for these metrics assuming "Gross Customer Orders (at LAC)" is computed as a metric.

Recommendation:

- Implement this metric immediately, at the ICP level, using the methodology described above.

9. Percentage of ICP-Supplier Items Filled On-Time (Excludes PV/DVD[Planned])

Definition: Number of items the ICP ordered from commercial suppliers delivered on or before the ICP requested data (excludes PV/DVD (planned)) divided by the total number of items the ICP has ordered

Perspective/Factor: Supplier Performance/Utilize Best Value

Commercial Equivalent: "Supplier On-Time Delivery Performance"

Purpose:

- This metric evaluates the ability of the suppliers to meet ICP RDD.
- Assists in providing a more thorough view of supplier performance.
- Metric is to complement other recommended metrics.
  - "Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD(planned) Shipments During a Specified Period)"
  - "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)"
- In conjunction with "Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD(planned) Shipments During a Specified Period)," this metric will allow the ICP management full visibility of all commercial supplier shipments.
  - The "Percentage of Items Filled On-Time (for Customer Receipts by PV/DVD(planned) Shipments During a Specified Period)" will capture all those shipments directly to the ICPs' customers with the exception of
    - PV/DVD (unplanned)
    - Non-stocked shipments directly to the ICP customer
    - Shipments to the DoD distribution depots.
  - This proposed metric will capture the areas not captured above.

- The proposed metric will also assist the ICP by providing information in two areas:
  - ➤ It will provide a means to evaluate the ICPs' suppliers. The information could then be used to eliminate poor performing suppliers and reward good performers
  - ➤ This metric also will assist the ICPs in identifying weak points in their supply chain that potentially increase pipeline time.

Discussion:

Pros:

- Supplements other recommended metrics in evaluating supplier performance.
  - ➤ This metric evaluates the ability of the suppliers to meet ICP RDD.
  - ➤ Assists in providing a more thorough view of supplier performance.
- Is consistent with complementary metrics since it is evaluated in the number of items delivered, not number of requisitions or number of contracts with the commercial suppliers.
- Treats a $1 item the same as a $1,000 item: Readiness does not care if it is a $1 item or $1,000 item.

Cons:

- Must segregate PV/DVD shipments into planned and unplanned shipments.
- Must capture shipments to the DoD distribution depots.
  - ➤ This is entering, for the first time, the supplier-warehouse interaction whereas the other metrics in this analysis have focused on the ICP-customer interaction.
  - ➤ This requires one to have access to new data files not related to shipments to the ICP customers, but to the DoD warehouses supporting the ICP.

Data:

Discussion:

- The PV/DVD (unplanned) and non-stocked shipments can be captured from the LMARS file.

- ➤ The percentage of items received on-time could be performed as is discussed in the metric "Percentage of Items Filled On-Time (for Customer receipts During a Specified Period)."

- ➤ Only those records in the LRT file of LMARS coded as PV/DVD(unplanned) and non-stocked would be evaluated.

- ◆ Shipments from the supplier to the DoD warehouses are the primary data hurdle for this metric.

  - ➤ One is attempting to capture information that is part of the contract negotiation between the ICP and the supplier, not the ICP and the customer in the field.

    - ■ No *common* data system was found that captured information on shipments from the commercial supplier to the DoD distribution depots.

    - ■ In addition, there was not necessarily a common file structure, such as DAAS or LMARS, that captures this information for the services and DLA.

  - ➤ In addition, incoming shipments should be evaluated to determine if the total quantity ordered or a partial quantity is received by the ICP's RDD.

  - ➤ To be consistent with the complementary metrics, only that portion of the shipment received by the RDD will be considered "on-time."

- ◆ DLA has an Automated Best Value System (ABVS) that collects the data necessary to calculate this metric. ABVS tracks delinquent (late) orders by supplier.

  - ➤ This system tracks incoming material shipments by Contract Line Item Number (CLIN) that contains the quantity requested.

  - ➤ Currently, the ABVS system does not track the quantity information except to determine if the contracted quantity was received by the due date.

  - ➤ The contractor is given a "Go/No-Go" for each CLIN with respect to meeting the delivery date and a percentage of supplier shipments on time is computed as the difference of total orders and delinquent orders, divided by total orders.

- ◆ Only DLA has a single common system among their ICPs.

- The services each have similar systems, but are not common among the services or between the ICPs within the service.

Summary:

- Data for those shipments to the field customers for PV/DVD(unplanned) and non-stocked items can be captured in LMARS LRT file in a manner similar to that used in other metrics.
- Data for shipments to the DoD distribution depots is being captured and could potentially be available, but not in a common form across the services and agencies.

Recommendation:

- The value of this data, especially in conjunction with that from the complementary metrics, makes this metric even more important to the ICP management.
- Recommend that the effort to collect the supplier-DoD distribution depot delivery data be investigated.
  - ➤ Examination should first focus on existing data in each service/agency.
  - ➤ Determine and evaluate the level of effort to overcome any identified problems in collecting consistent data across all services and agencies.
  - ➤ If feasible, implement the metric using data from different systems and evaluate its feedback value to the ICP management.
  - ➤ A long-term program to capture data in a single file, in a manner similar to LMARS, should at least be considered.

10. Warehouse Utilization

Definition: Percentage of wholesale warehouse storage capacity being utilized. Specifically, the percentage of DLA distribution depot covered storage (measured in cubic feet) being utilized

Perspective/Factor: Financial Performance/Reduce Excess Capacity

Commercial Equivalent: "Capacity Utilization"

Purpose:

- This metric will allow managers at the ICP level and higher headquarters to review one aspect of the impact of increased private sector support (i.e., increased DVD and PV utilization): the change in utilization of DoD storage facilities.
- This metric, in conjunction with the "Gross Customer Orders (at LAC)" will allow projected storage requirement changes to be compared to existing storage capacity and utilization.
- It will provide baseline information to compare to commercial sector warehouse utilization data.

Discussion:

Pros:

- Will provide an indicator of the impact on the distribution depot business area of the ICPs' decisions to increase private sector support in the supply management area.
- Warehouse or capacity is a common commercial measure so commercial benchmarks are available for comparison.
- Data are readily available for the proposed metric.
- Historical data is also available to support trend analyses.

Cons:

- Metric is measuring an area or outcome that the ICP manager does not fully control:
  - ➤ Many different ICPs affect the stockage level at a single distribution depot so one ICP's effect cannot be isolated.
  - ➤ The actual utilization rate may also be influenced by the warehouse managers in their policies and procedures. These actions are not under

the control of the ICP management and so the value of the metric to the ICP leadership is reduced

Data:

Discussion:

- Storage requirement has been requested previously in the POM (Format N-3C).
  - ➤ These data were reported in square feet and did not differentiate between covered and open storage.
  - ➤ The focus of this data call was to compute a storage cost requirement.
- DoD Storage and Space Management Report (DD Form 805) displays capacity and occupied storage data, by depot, for both DLA distribution depots and the service depots.
  - ➤ The focus of this metric is to capture the impact on the depots of increased private sector support.
  - ➤ The private sector supply support is primarily in the secondary items area.
  - ➤ Therefore, the most applicable data would be the utilization of covered storage in the DLA distribution depots versus the service depots (which store primarily end items).
- DoD Storage Space Utilization Report, which is a compilation of DD Form 805 for all components, point of contact is in DLA Defense Logistics Support Command (DLSC) and was contacted.
  - ➤ This data is available from DLA for warehouses on a quarterly basis.
  - ➤ Service warehouse, versus DLA warehouse, information is available on a semi-annual basis.
  - ➤ Data is available on a square foot or cubic foot basic.
- Historically in other metrics found, capacity data has been reported in cubic feet

Summary:

- Data for DLA distribution depots (covered) is available on a quarterly basis and will require no new data collection.

Recommendation:

- The metric has the potential to provide valuable insights into one aspect of the shift to commercial practices. The readily available data further supports the recommendation that the proposed metric be reported.
  - Initial focus should be on DLA distribution depots since this metric is based on examining the impact of secondary items becoming more directly commercially supported.
  - Subsequent reporting may be found useful for all depots; however, the service data should not be aggregated with the DLA data.
    - Report should initially be computed as cubic footage. The distribution depots should be consulted to determine if an alternative (i.e., square feet) is more appropriate. If an alternative is offered, the alternative should be evaluated for data availability at that time.

11. Gross Customer Orders (at LAC)

Definition: Gross customer orders to the ICP computed at LAC.

Perspective/Factor: Operational Performance/Reduce Excess Capacity

Commercial Equivalent: "Plan Stability"

Purpose:

- Proposed metric will assist ICP managers in identifying trends in customer activity (i.e., requirements placed on the ICP).
  - ➤ This will allow activity levels to be tracked and related to previously projected changes in activity to determine accuracy of specific forecasts.
  - ➤ The primary focus is to identify trends that will support analysis for changing the capacity at the ICP and storage depots. Changes may be caused by:
    - Customer activity changes due to customer funding;
    - Customer activity changes due to policy changes;
    - Change in practices (use of local purchase versus central supply).
- This is more of a planning metric than a performance metric.

Discussion:

General:

The objective is to capture customer activity. "Gross Customer Orders" versus "Gross Customer Sales" was examined since stock levels influence sales and may distort actual customer activity. LAC was selected to remove the impact of changing surcharges. If standard price was used, an increase in the surcharge could be interpreted as an increase in activity. "Gross Customer Orders (at LAC)" was selected to avoid both of these problems.

Pros:

- Using "Gross Customer Orders (at LAC)"
  - ➤ Will remove surcharge change influence;
  - ➤ Stock availability will not influence "Gross Customer Orders" as it would "Gross Customer Sales";

- ➤ "Gross" versus "Net Customer Orders" removes the influence of carcass returns associated with reparables.

- ◆ Data, once collected, also can be used in computing Material and Management Efficiency Change metrics.

Cons:

- ◆ Data for "Gross Customer Orders (at LAC)" is not currently reported in the budget documents.

- ◆ An approximation can be developed, but ICP input will be required.

- ◆ Data must be collected at the ICP and commodity level versus from a source readily available to the DoD leadership.

Data:

Discussion:

- ◆ Orders data (Gross and Net) are reported at standard price in budget documents.

  - ➤ Standard price includes the surcharge that varies by commodity.

    - ■ A single ICP can handle several commodities.

    - ■ Therefore, an ICP may have different surcharges dependent on the commodity.

  - ➤ Data found reported as LAC are sales data, not orders.

    - ■ Orders data preferred to sales data because customer activity represented by the order, not what was on-hand available to be distributed (i.e., stock availability versus sales).

  - ➤ Although not an exact conversion, "Gross Customer Orders (at standard price)" could be converted to "Gross Customer Orders (at LAC)," by ICP, by computing a composite ICP surcharge reflecting the mix of commodities order at the ICP by the customers.

    - ■ Data, by commodity, is used to develop the SM-2 budget display, which reports "Gross Customer Orders (at standard price)."

    - ■ This data may be used to compute the composite surcharge.

    - ■ The result of reducing "Gross Customer Orders (at standard price)" by the composite surcharge rate would result in an approximation of "Gross Customer Orders (at LAC)."

Summary:

- Capture "Gross Customer Orders (at standard price)" by ICP from SM-2 budget display input data or from the ICP itself, if not reported in the BES.
- Develop an ICP composite surcharge (i.e., a weighted surcharge) reflecting percentage of orders by commodity at the ICP.
- Convert the "Gross Customer Orders (at standard price)" by using the composite percentage for that ICP.
- The result would be an approximation of the "Gross Customer Sales (at LAC)."
- These approximations, by ICP, could then be grouped by service or agency, to identify customer activity trends.

Recommendation:

- Evaluate the effort to compute an ICP composite surcharge.
- If level of effort is acceptable, recommend the proposed metric be computed, by ICP.

12. Organic Inventory Turns

Definition: DoD annual gross sales for items not in the PV/DVD program divided by "Average Asset Value" of wholesale secondary items inventory in DoD warehouses.

Perspective/Factor: Financial Performance/Improve Inventory Efficiency

Commercial Equivalent: Similar to "(Inverse of Days of supply)*365."

Purpose:

- To supplement or replace the historically reported "Inventory Turns" (or "Inventory Turnover").
- The proposed metric removes the effect PV/DVD items have on the traditional "Inventory Turns" metric.
  - ➤ As PV/DVD items become more common, the impact of this change increasingly will affect the traditional "Inventory Turns" value.
  - ➤ For PV/DVD items, management costs are subsumed in the materiel cost driving up the sales (evaluated at LAC); thereby potentially increasing "Inventory Turns."
  - ➤ "Slow movers" may become an increasing percentage of the DoD stocked items causing "Inventory Turns" to decrease.
- The proposed metric will focus solely on those items stocked in DoD and therefore provide a more realistic indicator of the turnover of inventory in the organic, or DoD, distribution depots.

Discussion:

Pros:

- More accurately portrays the turnover of stocks controlled by the ICP since it is not biased by PV/DVD sales.
- Can be more accurately compared to commercial benchmarks.

Cons:

- Requires sales data to be segregated into sales of stocked items versus those items controlled by the private sector (i.e., PV/DVD items).
- This metric will be computed on a different basis than in the past; therefore, it will not be appropriate to compare to the historical metric, "Inventory Turns."

Data:

Discussion:

- Historically, "Inventory Turns" has been computed by using "Annual Gross Sales" (at LAC) as reported in the budget documents divided by the "Average Asset Value" (wholesale secondary items only, evaluated at LAC) less war reserves as reported in the Supply Systems Inventory Report (SSIR).

- For the proposed metric, we want to capture the gross sales of only those items shipped from DoD depots (i.e., non-PV/DVD sales from inventory).

  - As discussed in the earlier metrics discussion, LMARS captures requisition and shipment data from the DAAS.

  - LMARS has a file called the LRT file, and a data routine already exists to extract completed shipments (i.e., delivered to the requisitioner).

    - Gross Sales for items shipped from DoD distribution depots may be computed by evaluating specific completed records in the LMARS LRT file.

      - LMARS records reflect the item (i.e., the NSN) and the quantity shipped.

      - Gross Sales (at standard price) may be computed by multiplying the quantity shipped times the unit standard price.

      - This will require additional data routines to compute this gross sales number and the data routine must have to access to the item standard price.

        - Standard price is contained in the DoD catalog, Defense Logistic Information System (DLIS).

        - DLIS contains both NSN and part numbered items.

      - Only those records for shipments from DoD distribution depots should be manipulated.

        - Immediate Shipments from DoD distribution depots are identified by a "A" in card column 166 of the LRT file.

        - Backordered shipments from DoD distribution depots are identified by a "C" in card column 166 of the LRT file.

- The sales number computed above, if standard price was used, would not be at LAC as is the "Average Asset Value" in the SSIR.

- The organic inventory turns may then be computed by dividing the Gross Sales from the organic supply depots (at standard price) by the "Average Asset Value" at LAC.

  - This method would provide an upper bound for the true organic inventory turns that would be computed using gross sales from organic supply depot at LAC, if it were available.

- An alternative would be to evaluate the "Average Asset Value" at standard price.

  - The Central Secondary Item Stratification Report (the "STRAT") provides sufficient information to compute an "Average Asset Value" at standard price.

  - This then would allow both the numerator and denominator of the proposed metric to be in the same "units" (i.e., standard price).

  - The primary difference between the SSIR and the STRAT is that the SSIR inapplicable inventory has been corrected and reported at a lower value than in the STRAT.

Summary:

- A data routine will be required to evaluate the LMARs records denoting shipments from organic DoD supply depots. This will provide the Gross Sales from organic supply depots

- The "Average Asset Value" may be computed from the STRAT vice the SSIR to capture the value at standard price vice LAC.

Recommendation:

- Request that the services and agencies develop data routines to compute gross sales from organic DoD supply depots as outlined above.

- Examine the alternative of computing the "Average Asset Value" at standard price vice the traditional LAC from the STRAT.

- If acceptable, recommend this metric be computed service- or agency-wide.

13. Weighted Supply Availability

Definition: Weighted percentage (by number of requisitions) of stocked, non-stocked (PV/DVD), and non-stocked (DoD) filled "immediately."

Perspective/Factor: Customer Satisfaction/Improve Inventory Efficiency

Commercial Equivalent: None found at this time.

Purpose:

- Metric is to improve on the traditional "Supply Availability" metric with respect to customer satisfaction.
  - "Supply Availability" traditionally measures only the percentage of requisitions filled "immediately" from on-hand stocks
  - Not all stocks are planned to be on-hand (i.e., non-stocked and PV/DVD items); therefore, "Supply Availability" captures only a subset of the customers' perspective.

Discussion:

"Supply Availability," a metric that will be discussed later, is frequently classified as a customer satisfaction measure; however, this is not necessarily a valid classification. "Supply Availability," as presently computed, represents that percentage of customer requisitions filled "immediately" from on-hand stocks. If all items were stocked items (at DoD warehouses), "Supply Availability" should be highly correlated to customer satisfaction; however, this is not necessarily the case now and is increasingly becoming more incorrect as more items are supported directly by commercial suppliers (i.e., PV/DVD).

An alternative, "Weighted Supply Availability," was developed and proposed that would capture the percentage of customer requisitions filled "immediately," regardless of their source of supply (i.e., stocked, non-stocked, and PV/DVD). PV/DVD supported requisitions are important to capture because its use has grown significantly and is expected to grow even more in the future. A more comprehensive measure of customer satisfaction would capture all threes sources of supply; that was the intent of the proposed metric.

Although the traditional "Supply Availability" data was found to be readily available, this was not the case for the non-stocked and PV/DVD items. We reviewed LMARS data to determine if, with additional computational routines, the data could be captured. During this research, we came to the conclusion that the proposed metric would be redundant with the metric "Percentage of Items Filled On-Time (for Customer Receipts During A Specified Period)." From a customer perspective, an "immediate" fill of a requisition is not as relevant as receiving the materials by the customer's RDD. In other words, an "immediate" fill does not

ensure the customer receives the material by the RDD, the true measure of customer satisfaction.

Pros:

- Better portrays effect of ICP stockage (and non-stockage) decisions on customers.
- Provides an indicator of ICP forecast accuracy.
- Captures (and penalizes) ICP for moving items requested to non-stocked category.

Cons:

- Metric will be redundant with "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period)."
- Must capture requisitions by category (stocked, non-stocked [DoD], non-stocked [DV/PVP]).
- Must define "immediate" for non-stocked (DVD/PV) items.

Data:

Discussion:

- Weighted Supply Availability is a proposed metric that requires data on requisitions for three class of items that are its components–stocked items, PV/DVD managed items, and non-stocked items that are filled immediately
  - ➤ A previous source of data on requisitions that are filled from stock is discussed on the metric fact sheet for "Supply Availability"
  - ➤ The SAMMS system computes "Supply Availability", based on stocked item only, and produces a report for the ICP
  - ➤ An alternative source of data on requisitions that are filled from stock, via PV/DVD, and for non-stock items is LMARS
    - LMARS has codes for the type of fill, in field 166, for Immediate issue, Planned direct vendor delivery, Unplanned DVD, Non stocked, and others
    - An additional data routine would be required to capture the specific applicable records and compute the metric from the LMARS data.

Summary:

- Data at the service/component level are available to compute weighted supply availability through the LMARS data system; however, additional data collection routines would be required.

- After the data are collected and reported, the information would be redundant with the metric "Percentage of Items Filled On-Time (for Customer Receipts During a Specified Period.

Recommendation:

- Do not recommend that "Weighted Supply Availability" be computed because the additional effort to capture the data would not be offset by the value-added to the ICP managers.

14. Percentage of Customer Returns Due to ICP Errors

Definition: Total number of customer returns due to ICP errors divided by the total number of customer returns.

Perspective/Factor: Customer Satisfaction/Improve Inventory Efficiency

Commercial Equivalent: None identified.

Purpose:

- Provide senior leaders feedback on the extent to which ICP errors cause customers to return assets to the supply system.
- Metric is to complement "Percentage of Inapplicable Orders (Secondary Items)" metric.
  - ICP orders to suppliers may become "inapplicable" due to returns from the customer because items ordered when stock levels were low suddenly show excess after customer returns.
  - Understanding customer returns could in turn help reduce customer returns subsequently reducing the magnitude of the inapplicable orders problem.

Discussion:

Pros:

- Captures an ICP operational performance perspective not previously considered in this study.
- Improves on "Percent Customer Returns" metric in that it reflects that not all returns are caused by ICP errors (e.g., considers change in unit requirements).
- Complements another proposed metric, thereby providing the decision-maker with a broader base of information.

Cons:

- Unit of measure for the metric should be a shipment, not at the item level.
  - A single shipment of 10 items in error is one ICP error, not 10 ICP errors.
  - Data availability at the shipment level will be a challenge to collect

- Identifying the reasons for the returns requires consistent data collection at all locations, preferably at the ICP level.
- Must identify specifically the "error"(i.e., manufactured incorrectly, wrong quantity to customer).

Data:

Discussion:

- DLA currently is attempting to obtain customer feedback on supply errors.
  - ➤ Many customers have access to the Customer Depot Complaint System (CDCS) and the Standard Automated Material Management System (SAMMS).
  - ➤ CDCS is an ICP program that is to track all Quality Deficiency Reports (QDRs).
  - ➤ Customers can choose from a table of Discrepancy Codes (DCs).
    - For example, a "CAUSE" code refers to who (which organization) caused the discrepancy.
      - Summarizes the cause of the customer complaint.
      - In some cases, this cause will not be known or will not be reported.
      - The cause code for the ICP, as the cause, is "(SU)."
    - Due to the self-reporting required, finding many of these codes is not likely.
    - Monthly SAMMS reports include, among other things, discrepancy code data, the number of "reports of discrepancies" (RODS) per code, and the cause code.
- Customers in field units that do not have access to the CDCS can use the DLA web site Supply Discrepancy Report.
  - ➤ DLA requests that the customer answer a series of questions to identify the correct ICP that manages the NSN being reported, the nature of the discrepancy, and the customer preference regarding the item's disposition.
    - Customers must use appropriate codes in the report to indicate the problem (i.e. shortage, non-receipt, wrong item, over-shipment).

- In addition, in the case of a wrong item or over-shipment, the user must identify the shipper (i.e., DoD depot or contractor).

➤ Because of possible problems with self-reporting, it is not clear how to identify the actual customer errors attributable to the ICP, or to other organizations.

- We did not find information on customer reporting procedures and databases in the Army, the Air Force, or the Navy that were useful for this metric.

➤ These systems may exist, but were not found during this research.

Recommendation:

- The proposed metric should not be requested from the ICPs at this time.
- This metric should be considered after further assessment that the ICPs have the information systems in place that will provide the data in a manner that does not impose additional workload requirements.
- Must identify specifically what errors are to be counted.

➤ The focus should be on Customer-ICP interactions, not ICP-Manufacturer interactions.

15. Percentage of Inapplicable Orders (Secondary Items)

Definition: Material on-order (commitment and contract) in excess of Requirements Objective (RO) divided by total material on-order (commitment and contract) for secondary items

Perspective/Factor: Operational Performance/Improve Inventory Efficiency

Commercial Equivalent: None.

Purpose:

- The metric will provide summary information that can demonstrate to customers the impact that changing requirements has on ICPs operations.
- The metric will also highlight the change ICP managers can make on reducing the magnitude of this problem through changing procurement policies and procedures.
  - ➤ The ICP cannot eliminate the problem since requirement changes are primarily factors external to the ICP.
  - ➤ The proposed metric will highlight improvements the ICPs have made to better react to changing requirements.

Discussion:

General:

Approximately 17 percent of DoD secondary item procurement dollars are used to procure stock in excess of requirements; this warrants further review. This problem is attributed primarily to requirement changes after procurement actions have been initiated for an item. These procurement actions, if not modified, cause excess inventory, which ties up critical resources (both dollars in inventory as well as storage space).

One approach to reduce the problem is for the requirements forecasts to be more accurate and less variant; however, this is more in the control of the customer than the ICP. This metric will assist the ICP leadership in highlighting this problem to its customers.

The other approach is to amend the procurement processes to support changes in on-going procurement actions. By being able to modify the procurement actions, scarce procurement resources will be released to purchase other items. This aspect is primarily under the control of the ICP; however, these changes must be such that procurement actions are not cancelled just to be reinitiated in the near term.

Pros:

- Highlights an area that if reduced:
  - ➤ Releases funding to be used in procuring other items.
  - ➤ Reduces excess inventory.
  - ➤ Reduces storage costs.
- This is an area that the Navy has shown significant improvements.
- Summary level data is available in current systems.

Cons:

- Navy has already focused on this problem and will potentially gain limited information from the metric.
- The individual ICP has limited control over several factors driving this problem (i.e., changing requirements); actions are required by the customer as well as the ICP to reduce this problem.
- Data at ICP level is not available in standard reports to Office of the Secretary of Defense (OSD) for all services.

Data:

Discussion:

- Data, at some level, is available in the Central Secondary Item Stratification Report, frequently referred to as the STRAT report.
  - ➤ Report is produced semi-annually (end of March and September).
  - ➤ Data contained in the report applies only to the secondary items, not end items.
- At the OSD level, data by Service/Agency is available at the following levels:
  - ➤ Army: at the individual ICP level.
  - ➤ Air Force: at the aggregate service level disaggregated only by repairable and consumable categories.
  - ➤ Navy: at the budget project level.
  - ➤ DLA: at the individual ICP level.

Summary:

- Data, at some level, is available from currently existing reports.
- No new data collection will be required for all but potentially the Air Force.
- Data can be supported only at the aggregate service level, not at the ICP level, consistently across all Services and Agencies.

Recommendation:

- Metric should be reported at the ICP level.
- The STRAT will support this for the Army, DLA, and Navy.
- The Air Force should be queried to determine if data at an ICP level is available.
  - ➤ If so, request that it be reported.
  - ➤ If not, evaluate the workload of computing this metric.

16. Supply Availability

Definition: Percent of requisitions filled immediately from stock on-hand.

Perspective/Factor: Operational Performance/Improve Inventory Efficiency

Commercial Equivalent: "Fill Rate"

Purpose:

- Allows the ICP management to capture the ICP's capability to fill requisitions "immediately" for a subset of the items managed (i.e., stocked items).
- Provides the ICP and senior logistics managers an indicator of the impact of ICP's decisions and policies on the ICP's ability to have stock on-hand when needed. Such a metric would indicate that:
  - ICP procurement resources are being focused on the items being requested.
  - ICP's requirements forecasting methods are adequate.
  - ICP is accurately capturing administrative and production lead-times.
  - Suppliers are performing as expected (with respect to deliveries to the DoD warehouses).
- This metric could additionally support a drill down capability (to focus on a Federal Supply Group or select items) that would allow the ICP to identify those items better suited for private sector support.

Discussion:

Pros:

- Captures a major trade-off with respect to reducing inventory (i.e., stock availability).
  - If inventory is reduced (i.e., reduce safety stock), stock availability performance may decrease.
  - If inventory increases, performance may temporarily increase; however, limited funds will be tied up in inventory and not be able to be focused on items currently being requested.
  - If one is able to focus the limited resources on those items more frequently demanded, performance may increase.

- It is a valid measure of how well the ICP is managing those *items selected to be stocked* (versus non-stocked).

Cons:

- Metric can cause counter-productive behavior.
  - ICP can manipulate this measure by changing an item from stocked to non-stocked category thereby improving the metric, but not necessarily the service to the customer or the efficiency of the operation.
- Metric is not indicative of service level from the customer perspective.
  - Does not provide an upper bound or lower bound on customer service level if only stocked items are evaluated.
  - Immediate fill from stock does not necessarily mean the customer received the correct items on time.
- Metric is of more value to the ICP management than it is to the OSD level managers.
  - Metric requires to be supplemented with an additional metric that captures inventory decisions impact on the customers.
  - A "Weighted Supply Availability" metric was discussed as a supplement.
- Data consistency must be examined between services and agencies with a common rule-base being established and published for all reporting elements.

Data:

Discussion:

- Supply availability (for stocked items) has been a common metric within DoD.
  - This data has been collected and reported as part of MILSTEP (Supply Availability and Workload Analysis Report); however, MILSTEP is no longer a formal reporting system.
    - Data was available by commodity by quarter.
    - Summary data (by component, by FY) was also available.
- Supply availability data continues to be reported in the BES by all services and DLA.

- ➤ Source of data reported in BES is not known; however, data are availability on at least an annual basis.
- ➤ Consistency of BES data (i.e., same rule base) could not be confirmed.
  - A single rule-base for the computational methodology should be developed and published. Areas that need to be considered include:
    - Time frame allowed for "immediate" fill;
    - The method to count partial fills from multiple sources; and
    - Handling of PV/DVD requisitions.

Summary:

- ◆ Supply Availability data are available at the service/component level, at a minimum of annually.
- ◆ A rule base should be developed to ensure consistency of reporting from the components.

Recommendation:

- ◆ Proceed with the metric as described above, requesting it be reported at the ICP level.
- ◆ Query the services and DLA to capture their rule-base for computing "Supply Availability."
- ◆ Confirm that a common rule-set is being used. If not, develop and coordinate a common rule-set

17. Percentage of Redundant Requisitions

Definition: The total number of resubmitted requisitions (with original information) for inventory visible to the Total Asset Visibility (TAV) system divided by the total requisitions for inventory visible to the TAV system.

Perspective/Factor: Customer Satisfaction/Increased Use of Technology

Commercial Equivalent: None.

Purpose:

- The objective of TAV is to "increase user confidence in the DoD logistics system and to reduce duplicate requisitioning."
- This metric is intended to provide senior managers, at both the DoD and the ICP level, information on the ability of TAV to provide the right information, in real time, to the customer.
  - ➤ This assumes that the query is properly constructed.
  - ➤ It also assumes that duplicate requisitions can be identified distinctly from additional requirements for the same item.
- This objective also indicates that a lack of user satisfaction with the current system exists. This produces uncertainty about getting requisitions satisfied, which results in duplicate requisitions.
  - ➤ This metric will also provide an indicator of the level of confidence by the requisitioner.
  - ➤ This assumes that the customer does not find alternative ways to fill requisitions, rather than resubmit initial ones.

Discussion:

Pros:

- Captures an indicator of poor information flow between supply chain elements, particularly the customer and the ICP.
- Will provide supporting information on the magnitude of the problem identified in joint TAV strategic plan.

Cons:

- Metric may overstate requisition redundancy due to lag in information updates to the Joint Total Asset Visibility (JTAV) system.
- Very specific data are required to compute the measure so data availability may continue be a major problem.

Data:

Discussion:

- In order to compute this metric, a clear definition of items visible to JTAV is required.
  - ➤ The JTAV system is currently evolving from an "as is" architecture to a proposed architecture.
  - ➤ A clear baseline of systems included or accessed by JTAV is still evolving and is not easily identifiable.
- In addition, an acceptable data source or methodology to capture "redundant requisitions" could not be identified.
  - ➤ The "redundant" requisition would appear the same as a new requirement to the inventory management system.
  - ➤ Only the user can actually determine or state that the requisition is a duplicate.

Summary:

- Although the metric is still believed to be a valid and an important indicator, a methodology and data source were not identified.
  - ➤ JTAV's evolutionary nature is such that most methodologies developed near-term could quickly become obsolete.
  - ➤ Identification of "redundant" requisitions is not possible at this time.

Recommendation:

- Recommend monitoring the JTAV Office (JTAVO) and its on-going effort to develop specific metrics.
  - ➤ JTAV is developing and implementing an architecture that may eventually provide the data for the proposed metric.

- Coordinate with the JTAVO to understand metrics they are considering.

- Continue to evaluate the feasibility of this particular metric.

  - ICPs should provide appropriate assistance in evaluating the proposed metric.

  - If it is determined that data cannot be provided, an alternative measure indicating customer confidence should be investigated.

18. Percentage of Total Asset Visibility and Accessibility Achieved

Definition: The volume of the material assets that is visible to the Joint Total Asset Visibility (JTAV) system divided by the total volume of material assets within DoD.

Perspective/Factor: Product/Service Quality/Increased Use of Technology

Commercial Equivalent: Related to "Inventory Cycle-Counting Accuracy"

Purpose:

- This proposed metric is to provide senior managers information concerning the portion of material inventory that is captured by the JTAV system.
  - The JTAV system includes an architecture of systems for both CONUS and IN-THEATRE (i.e., OCONUS).
  - Visibility will be both at the wholesale and retail level.
- It is intended that JTAV will, through increased visibility of material inventory:
  - "Increase user confidence in DoD logistics systems to reduce duplicate requisitions;"
  - Expose bottlenecks in supply and transportation;
  - Allow Integrated Material Mangers to offset wholesale procurements;
  - Identify and use excess retail assets; and
  - Enable commanders to optimize employment of assigned personnel."
- The ability of JTAV to achieve the above goals depends highly on the breadth of coverage of the JTAV system.
  - The proposed metric is an attempt to measure this breadth of coverage
  - One can assume that as the percentage coverage increase, the ability to achieve the system goals also increases.

Discussion:

General:

JTAV has and continues to be evolutionary. Initially, it was focused only on materiel assets; however, it has evolved into visibility of personnel assets, at certain levels. The proposed metric was formulated under a dated understanding of

JTAV; therefore, the proposed metric is not necessarily appropriate to measure the status or success of JTAV in attaining its underlying goals in all areas.

Discussions with the JTAVO highlighted that the identification of metrics was an area of interest; however, substantial efforts to identify and evaluate potential metrics was yet to be undertaken.

Pros:

- TAV, and one could assume JTAV, is a Government Performance and Results Act (GPRA) area of focus and has a similar measure in the area of material assets
- The proposed metric captures the degree of JTAV coverage with respect to material.
- As originally envisioned, the metric would measure the degree of coverage that should correlate to JTAV achieving its goals. This would in-turn helps achieve the goals for CWT and LRT.

Cons:

- The original concern was to determine the unit of measure for "volume."
  - ➤ Dollars do not necessarily capture the relative importance of items.
  - ➤ Number of items may be better from a readiness perspective.
- Determining the denominator for the proposed metric will be difficult.
  - ➤ For example, retail assets not currently visible most likely would not be included in the denominator of the metric today.
  - ➤ Tomorrow, when those assets are captured in JTAV, the denominator will also likely increase.
  - ➤ The denominator is also a moving target.
- A source for the existing metric could not be located (i.e., that described in the GPRA).
- Probably most important, JTAV's goals are beyond just materiel visibility so a much more comprehensive metric is required.

Data:

Discussion:

- JTAV, as a system, is evolving from an "as is" architecture to a proposed architecture.
  - ➤ JTAV has existing capabilities: JTAV is operational in European Command (EUCOM), Central Command (CENTCOM), Atlantic Command (ACOM), Southern Command (SOUTHCOM), Special Operations Command (SOCOM), Pacific Command (PACOM), and U.S. Forces Korea (USFK) and tracks in-theater assets, both materiel and personnel.
  - ➤ JTAV is and will continue to evolve.
    - JTAV's strategy is that data requirements will be satisfied by accessing data from national systems such as: the Global Transportation Network (GTN); the Logistics Information Processing System (LIPS); and the national inventory control point automated information systems (AISs).
    - Systems will continue to be "added" to the JTAV architecture.
- JTAV is extending beyond that originally envisioned and the metrics that had previously been developed are no longer believed to be appropriate.
  - ➤ Early in JTAV, or TAV, the focus had only been on materiel.
    - The current JTAV requirements include not only materiel but also personnel.
    - Previous metrics, and the metric proposed here, would not appropriately reflect JTAV's capabilities.
- JTAVO is attempting to identify and use appropriate metrics.
  - ➤ JTAVO is looking at the "Number of Systems Accessed" as a potential metric instead of the amount of data as a potential metric because the former provides more information.
  - ➤ Documentation shows the number of queries and users per month have been tracked in EUCOM as a potential metric.
  - ➤ These, among others not highlighted here, may be alternative metrics that should be considered.

Summary:

- JTAV is an evolving system.
- Metrics originally considered, both by DoD and for this analysis, do not necessarily reflect JTAVs' total potential contribution to the logistics system.
- Data for a metric is a secondary issue. A more accurate measure must first be investigated. Only then can data availability be evaluated.

Recommendation:

- Coordinate with the JTAVO to capture any research it has performed reference potential metrics.
- Gain an understanding of metrics it has considered and is considering.
- Assist in the identification of new metrics, especially as the full breadth of the JTAV system evolves.
- Continue to evaluate the feasibility of potential metrics in concert with the JTAVO.

19. Percentage of Transactions Performed Electronically

Definition: Total number of ICP transactions (with suppliers) that are executed by electronic means divided by all executed supplier transactions (including traditional paper invoices).

Perspective/Factor: Operational Performance/Increased Use of Technology

Commercial Equivalent: None

Purpose:

- A DoD goal is to enable authorized defense contractors and DoD personnel to access electronically the documents needed for a payment action (i.e., a paperless environment).
- The proposed metric will provide senior managers information on the extent to which ICP/supplier transactions are being performed electronically, thereby reflecting the degree that the DoD policy for electronic commerce has been implemented.

Discussion:

General:

A major hurdle in the implementation of this metric will be the identification of specific transactions that will be included in this metric. The focus could be exclusively on payment of suppliers or broadened to all transactions after a negotiated contract is complete.

Originally, metrics such as "Percent of Invoices Submitted Electronically" and "Percent of ICP Orders Placed Electronically" were considered; however, these metrics did not fully capture the intent of the metric and focused on only a subset of all interactions between the ICPs and their suppliers. To properly design a metric in this area, detailed discussions with ICP procurement personnel would be required and was beyond the scope of this effort.

Pros:

- The proposed metric allows for capturing a diverse cross-section of transactions conducted electronically between the ICP and the suppliers.
- This more broad metric more accurately reflects movement toward full electronic interface than a metric focusing on a single type for transaction (i.e., invoices, orders, payments).
- The more comprehensive metric is more suitable for senior managers.

Cons:

- Must define electronic transactions (i.e., E-mail, fax).
- Must identify types of transactions to be captured (i.e., ICP orders, RFQs, payments to suppliers).
- No commercial benchmark for such a metric was located.
- The proposed metric does not relate transactions to specific areas (i.e., PV/DVD(planned) versus PV/DVD(unplanned), PV/DVD versus organic, etc.), if such visibility is desired.

Data:

Discussion:

- DoD has several tools available to improve the receipt, management processing, storage, and retrieval of documents required in the bill paying process.
  - ➤ These tools include:
    - Electronic Document Management (EDM)
    - Electronic Document Workflow (EDW)
    - Electronic Document Access (EDA)
    - Electronic Data Interchange (EDI)
  - ➤ DLA Policy Letter (29 January 97) tasks each DLA activity to make maximum use of the enabling technology of electronic commerce (EC) and electronic data interchange to achieve benefits stated in the National Performance Review.
    - Defense Supply Center Columbus has the Electronic Contract Folder, a paperless procurement folder that is completely electronic and interactive.
    - Defense Energy Support Center has the Paperless Ordering & Receipt Transactions Screens (PORTS) that will process fuel orders and provide receipts and invoiced for deliveries to DoD and other federal government customers. PORTS is part of the DLA e-Mall.
- The different methods and systems of implementing electronic commerce within DoD are a major roadblock to measuring progress in this area.

Summary:

- Several separate systems to support paperless transactions were located, but a common transaction focus was not found.
- Although initiatives are underway to expand electronic transactions, we did not find a DoD system or methodology that would allow one to determine the volume of transactions, either in a traditional manner or in the paperless manner.

Recommendation:

- The different method and systems of implementing electronic commerce within DoD are a major roadblock to measuring progress in this area.
- The payoff of attempting to measure progress (i.e., collect data) in this area should first be examined.
  - ➤ If found to be a potential high payoff area, the initial measurement effort should first be focused on identifying the type of transactions to capture.
  - ➤ If found to be a low payoff area, further consideration may not be of sufficient value to warrant the effort to collect the data.

Appendix B
Abbreviations

ABVS	Automated Best Value System
ACOM	Atlantic Command
AIS	Automated Information System
ALT	Administrative Lead-Time
BES	Budget Estimate Submission
CDCS	Customer Depot Complaint System
CENTCOM	Central Command
CINC	Commander-in-Chief
CLIN	Contract Line Item Number
CONUS	Continental United States
CWT	Customer Wait Time
DAAS	Defense Automatic Addressing System
DC	Discrepancy Code
DLA	Defense Logistics Agency
DLIS	Defense Logistic Information System
DLSC	Defense Logistics Support Command
DoD	Department of Defense
DoDAAC	Department of Defense Activity Address Code
DORRA	Defense Logistics Agency Office of Operations Research & Resource Analysis
DVD	Direct Vendor Delivery
DWCF	Defense Working Capital Fund
EUCOM	European Command
GPRA	Government Performance and Results Act
GTN	Global Transportation Network
ICP	Inventory Control Point
JTAV	Joint Total Asset Visibility
JTAVO	Joint Total Asset Visibility Office

JTF	Joint Task Force
LAC	Latest Acquisition Cost
LIPS	Logistics Information Processing System
LMARS	Logistics Metrics Analysis Report System
LRT	Logistics Response Time
MRO	Material Release Order
NSN	National Stock Number
OCONUS	Outside Continental United States
OSD	Office of the Secretary of Defense
PACOM	Pacific Command
PLT	Production Lead-Time
POM	Program Objective Memorandum
PV	Prime Vendor
QDR	Quadrennial Defense Review
QDR	Quality Deficiency Report
RDD	Required Delivery Date
RO	Requirements Objective
SAMMS	Standard Automated Material Management System
SCOR	Supply Chain Operations Reference
SOCOM	Special Operations Command
SOUTHCOM	Southern Command
STRAT	Central Secondary Item Stratification Report
TAV	Total Asset Visibility System
UMMIPS	Uniformed Materiel Movement and Issue Priority System
USFK	United States Force Korea