LINKING RESOURCES TO LOGISTICS CAPABILITIES

A PROFILE OF RECENT EFFORTS

REPORT LG702T1

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OCTOBER 2007

Executive Summary

This report presents the results of an assessment of past and current efforts to identify and align resources to logistics. It provides an analytical basis for improving and expanding DoD's ability to link programmed and budgeted resources to logistics capabilities, allow for greater visibility into program financing, facilitate trade-off management, and enable more informed decision making. In our assessment, we focused on three approaches for determining and reporting logistics resources. We then profiled these approaches, identifying their purposes, objectives, sources of data, and outputs in an effort to understand them in some detail, determine their strengths and weaknesses, and develop a set of lessons learned based on our observations.

STRENGTHS AND WEAKNESSES

The three approaches we assessed were the Logistics Cost Baseline, the Logistics Resource Baseline, and the Program Element (PE)–to–Joint Capability Area (JCA) mapping effort.

The Logistics Cost Baseline has the ability to provide both accurate and summary information on logistics costs for the operating forces in the areas of supply, maintenance, and transportation within the budget years and the out-years of the Future Years Defense Program. However, its ability to provide detailed resource information for analysis supporting decision making is limited.

The Logistics Resource Baseline contained data on additional resource categories beyond operations and maintenance—the focus of the Logistics Cost Baseline. The baseline also provided a more detailed view of individual Service-level programs, primarily by appropriations-detail categories that comprise the overall Office of the Secretary of Defense (OSD) program. However, we found the data are not uniform and the approach does not provide a defined structure with which to understand and apply the data for any type of review of logistics investment.

The PE-to-JCA mapping effort, primarily because of its use of a centralized database of financial information, affords the ability to maintain data currency and relevance in the support of new management concepts, such as portfolio management.

It also appears to have a sustainable capability because of its high data availability and low requirement for broad consensus and manpower requirements. Although the PE-to-JCA effort achieved its objective of mapping resources to JCAs at the aggregate level, it still has a requirement for greater uniformity of data. Because one PE can be linked to multiple JCAs, it is not possible to sum resources in terms of JCAs, thus reducing its utility for resource analysis.

LESSONS LEARNED

During this assessment, we compiled many lessons learned. Most of these lessons were specifically related to particular approaches, but several transcended individual initiatives to form a general lessons-learned architecture for follow-on efforts. Four of these lessons are summarized below.

1. *Clear up-front annunciation of how the information will be used.* We found that understanding the desired output largely determines the scope and depth of the input, to include identifying what data domains and detail are relevant to achieve the desired output.

2. *An unambiguous set of business rules that link resources to capabilities.* The rules should include a clear articulation and agreement among DoD components on logistics terms and references. Because the components collect and aggregate their data in different ways, these common terms and references would ensure uniform and consistent outputs.

3. *Participation by all DoD components, including process owners.* This participation is critical. The core data are primarily maintained by the Services. Efforts to link resource data to logistics will not succeed without easy access to Service baseline data, and the experience and knowledge of program subject matter experts.

4. *An upgraded OSD PE code structure.* In its present form, this code structure does not provide the level of detail necessary for effectively linking logistics programs to resources. "Program elements (PEs) in the FYDP no longer provide a relevant view of DoD outputs. There is an unclear relationship between PEs and programs of interest to DoD leadership and analysts."[1] Even with well-structured business rules, identification of logistics within PEs is very difficult.

The conclusions we reached during our assessments, and the associated lessons learned, will guide us through the next phase of this project: developing business rules for effectively linking resources to logistics capabilities in an integrated, repeatable process.

[1] Secretary of Defense Memorandum, subject: "Program/Budget Data Integration," May 15, 2007.

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Chapter 1
Introduction

This report presents results from the first of three tasks scheduled for the initial year of a multiyear effort. That effort is designed to improve and expand the capability of the Deputy Under Secretary of Defense, Logistics and Materiel Readiness (DUSD[L&MR]), to link programmed and budgeted resources to logistics capabilities and to improve visibility into program financing, facilitate trade-offs, and enable more informed decision making. This first report provides an assessment of current and past efforts to identify and align resources to logistics. Also, because the Future Years Defense Program (FYDP) Programs of Record have a major role in this assessment, we provide a brief overview of how Program Element (PE) codes are used to identify programs, as well as their utility.

In this report, we profile the following approaches for determining and reporting logistics resources:

- Logistics Cost Baseline
- Logistics Resource Baseline initiative
- Joint Capability Area (JCA) mapping.

In support of our assessment, we began by developing a Logistics Resource Visibility Assessment Model. We then applied the model to the three logistics resource reporting approaches, identifying their purposes, objectives, sources of data, and outputs. The intent of this application was to capture good ideas, strengths and weaknesses, and lessons learned. That information would then allow us to build on past work in the next phase of this project.

BACKGROUND

As a part of the 2001 Quadrennial Defense Review (QDR), DoD shifted from threat-based planning to capabilities-based planning. The 2006 QDR reaffirmed this shift and emphasized the need to manage DoD's resources in terms of joint capability portfolios. The objective of this shift in management emphasis was to provide new direction for accelerating the transformation of DoD, and to focus more on the needs of combatant commanders through development of joint capability portfolios and integrated capability management. DoD's approach for achieving this goal is joint capability portfolio management (CPM), which calls for managing similar capabilities as groups to optimize their effectiveness while efficiently applying resources. The Deputy Secretary of Defense designated Joint Logistics as one of four areas for CPM. Developing the ability to effectively link

resources to joint logistics capabilities is a key enabler and one of the first and most important steps in ensuring detailed, focused analysis that leads to better-informed CPM decision making.

Oversight of logistics to support CPM requires the ability to identify resource trends; have visibility into resource trade-off decisions below the DoD level; analyze changes in planning, requirements, and program of record positions; assess potential resource changes in terms of their risk to the overall program or capability; and have the requisite fiscal data to compare internal or external values. The current capability to perform logistics resource analysis is limited because of the absence of embedded processes in existing financial data systems to support this type of data analysis.

ASSESSMENT APPROACH

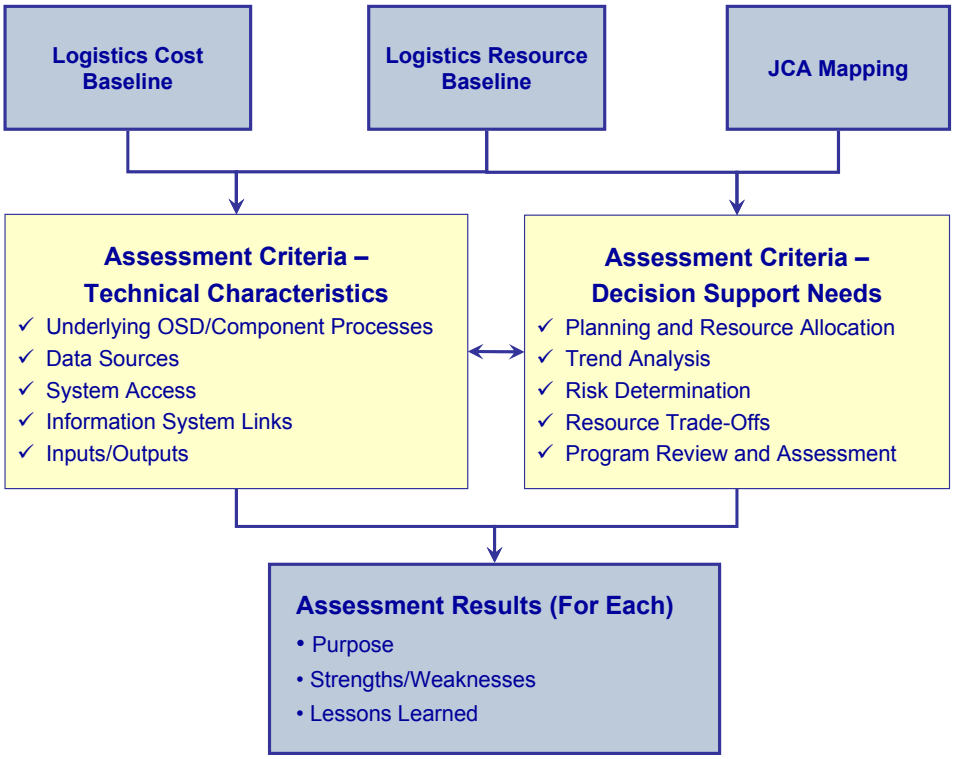
To assess the various approaches to determining logistics resources, we developed a Logistics Resource Visibility Assessment Model. The purpose of this model was to help us determine the purposes, strengths, and weaknesses of existing approaches, and to develop lessons learned for a follow-on application.

The model supports two areas of assessment. One area considers the technical aspects of the evaluated approach. Those aspects include the underlying processes for accessing data; its data sources, including level of data element detail, how data are accessed to produce logistics resource information, and the supporting information systems and their linkages; and the inputs and outputs the reporting approach receives and provides.

The second assessment area supported by the model is the ability of the evaluated approach to support decision needs. Those needs include how well the approach supports planning and resource allocation, trend analysis, risk assessment and determinations, identification of resource trade-off analyses, program reviews, and assessment activities.

Our Logistics Resource Visibility Assessment Model is depicted in Figure 1-1. Appendix A provides model assessment data for each of the approaches profiled in this report.

Figure 1-1. Logistics Visibility Assessment Model



How well key decision needs are met is important to an assessment of past and current approaches. Our assessment model identifies the resource-based analytic activities that we consider essential to any approach designed to support more informed resource decision making:

- Planning, requirements determination, and resource allocation
- Trend analysis
- Risk determination and assessment
- Resource trade-off analysis
- Program review and assessment.

We address each of these activities in the following subsections.

Planning, Requirements Determination, and Resource Allocation

Planning, requirements determination, and resource allocation are key elements of an organization's strategy. They support the decision-making process by establishing a strategic foundation based on the objectives of the program or capability in the planning phase, by ensuring understanding and providing visibility into the

essential requirements and their resources that enable the program, and by allocating resources among various programs to achieve the organization's near- and long-term objectives and goals. These elements also include the actual allocation decisions and the development of contingency plans.

One of the critical factors for effective planning, requirements determination, and resource allocation is thorough insight into current programs in terms of their developmental status (program objectives and capabilities, and how they relate to the National Defense Strategy) and resource requirements (basic program requirements, validity, properly resourced, and how resources are aligned with validated requirements). It is also important to know how individual programs are linked to other new or ongoing programs, and the significance of those linkages, not just in terms of capabilities, but also in terms of resource and programmatic commonalities that can be influenced and leveraged to improve each program. Another factor is the ability to determine how well individual programs are aligned with current Strategic Planning Guidance (SPG, also known as Guidance for Developing the Force [GDF]), and other DoD planning objectives. Finally, an annual review is necessary to assess changes to the program of record, including changes in execution and other programmatic adjustments that affect program execution and integrity.

Trend Analysis

Trend analysis is used to monitor a process and analyze variation in order to keep the process within a controlled state. In effect, it is the ability to monitor a program or a capability against an approved plan. Trend analysis involves the collection of data that enable a manager or analyst to identify patterns or trends in information that deviate from planned or established expectations and take the actions necessary to restore the program or capability to plan. Trend analysis allows for the prediction of future events, as well as the assessment of causes related to past events. It requires aggregation of data collected for specific activities and in sufficient detail to support the analyses. For decision makers to understand the probable cause behind trends, analysts must be able to obtain the right information in a timely manner to identify a program's direct and indirect activities. Because change is inevitable, data must be updated on a regular basis consistent with program and budget changes within Planning, Programming, Budgeting and Execution (PPBE) processes.

Risk Determination and Assessment

Senior leaders and decision makers must be able to make critical decisions within a structure that integrates their awareness and expertise into an analytical process, especially when there is substantial uncertainty. Risk determination, also known as risk management, requires the evaluation and selection of carefully considered risks for assessment in order to control or minimize their adverse effects on a program or capability. It involves a variety of factors, such as development of

cost-benefit excursions and identification of alternative approaches, among others. It is enabled by a robust ability to link resources to key program success criteria in the context of conducting a risk analysis and generating an acceptable course of action (COA) assessment. The ability to realistically estimate resources for COA evaluation is critical. Achieving this ability means having regular access to resource data that is robust enough to logically support assessment conclusions and portray the ramifications of associated decision options.

Resource Trade-off Analysis

Existing technologies are often replaced when new technologies become available. Within DoD, as in most large enterprises, additional resources to fund newly developed technologies are at a premium. As a result, funding of new technology-driven capabilities must compete with institutionalized, more mature, and better resourced programs, which are often of a legacy nature or within their programmatic development cycle. Within this zero-sum environment, the basic issue often becomes how can resources be restructured, and where would the funds come from to develop the new capabilities. Trade-off analysis is a means for

- identifying sources of potential resources to support new capability development or
- providing a manager or decision maker with the in-depth knowledge necessary to defend an existing program from a potential restructure.

Trade-off analysis is a technique that balances the time, cost, and performance of competing programs. It compares the cost and benefits of new capability-supporting technologies with those of existing programs in an effort to identify resourcing alternatives. Well-developed analyses are often used to inform the decision makers and aid in decision justification. As a result, the level of resource data used in supporting trade-off analyses must be complete, timely, and detailed to the extent of allowing evaluation of adjustments to program and capability funding.

Program Review and Assessment

Program review and assessment is the means by which DoD ensures that its investments are aligned with SPG and other strategic objectives. This alignment requires visibility of program investment information and DoD's capability objectives. Investment data must be visible at all levels and detailed enough to support identification of inconsistencies in funding that would make the program or capability susceptible to unilateral adjustment. In addition, visibility into resource pools within established programs is also needed to help identify offsets to satisfy internal restructuring requirements or provide external bill-payer requirements.

PROGRAMS AND PROGRAM ELEMENT CODING

The PE code, the primary data element in the FYDP, is the major aggregation at which a specified program effort is organized, budgeted, and reviewed. There is a unique PE for each program. The PE describes the program mission and identifies the organization responsible to perform the mission. It may consist of forces, manpower, material (both real and personal property), services, and associated costs.

As a primary data element in the FYDP, a PE generally portrays aggregations of organizational entities and associated resources. As an example, a PE could display the total resources assigned to a program; weapons systems and support systems within a program; aggregate resources within assigned appropriations, in logical groupings; and selected functional groupings of resources.

Within DoD, programs are the outputs, while resources are the inputs. A PE aligns outputs with inputs to give DoD visibility of defense programs and a common structure for examining programs and resources at the macro level.

PEs were not designed to provide decision makers with visibility into sources, compositions, and interrelationships of resource data. The linkages that provide for the sourcing of baseline resource data are primarily aligned to the budget and budget execution processes, and are generally outside the FYDP–PE construct.

As DoD has moved from relying on program-level information to define its outputs to a more capabilities-based construct of outputs, and because programs and their associated resources have become highly interrelated, DoD now has a need for more sophisticated and detailed analyses of resource domains at levels substantially below the PE level.

> Program Elements (PEs) in the FYDP no longer provide a relevant view of DoD outputs. There is an unclear relationship between PEs and programs of interest to DoD leadership and analysts.[1]

Because PEs were designed to support the FYDP construct by allowing for macro analysis at the appropriation level, they do not give today's capabilities-interest analysts the data, tools, or means to breakdown macro-level resource input data to the appropriate data source. In the current resource interdependent environment, this capability is key to providing DoD-level executives with the necessary levels of visibility into specific resource ownership and origination domains to enable the reconstruction of programs using their input data aligned within functional output domains (e.g., logistics) to support effective decision making.

[1] Secretary of Defense Memorandum, "Program/Budget Data Integration," May 15, 2007.

Chapter 2
Logistics Cost Baseline

BACKGROUND

In 1999, the DUSD(L&MR) developed a method for estimating DoD's cost of logistics. For the purpose of determining logistics resource costs, the definition of logistics was limited to activities under the purview of DUSD(L&MR)—maintenance, supply, distribution, and transportation—and costs from the four Services, their reserve components, and Army and Air Force national guards.

This method used three main components to estimate DoD's logistics resources:

- *Directly funded logistics programs*. All Operations and Maintenance (O&M) appropriated logistics programs in the FYDP database were identified. All resources were identified at the PE level and included all military personnel pay.

- *Defense Working Capital Fund* (DWCF) *customer purchases not in directly funded logistics programs*. Revenues from supply (including distribution), maintenance, and transportation business areas—from the program objective memorandum (POM) submission tabs N2 and N3A of the DWCF business plans—were included as logistics resource costs.

- *Active military, civilian, and reserve logisticians not in logistics programs or the DWCF*. The Defense Manpower Data Center (DMDC) database identified the active military, civilian, and reserve logisticians not listed in logistics programs or the DWCF. This database linked personnel to PEs and identified personnel with logistics job codes.

Over the past several years, changes in defense programming processes and the deterioration of data reported to DMDC have forced the DUSD(L&MR) to alter its method for measuring logistics resources. The current method uses two main components to estimate DoD's logistics resources:

- *Active military, civilian, and reserve logisticians*. Job skill codes in the DMDC database are used to identify active military, civilian, and reserve logisticians.[1]

- *Logistics programs*. All logistics-related, O&M-specific line items in the OP-32 budget documents (which cover the most recent historic year, the

[1] LMI, *DoD Logistics Resource Baseline*, Report LR503T, Lori B. Dunch and Norman T. O'Meara, February 2006.

current execution year, and budget year) are used to develop resource cost information.

PURPOSE

The Logistics Cost Baseline is used primarily to support macro-level trend analyses. Data for each Service, as well as their reserve and national guard components, may be viewed historically in the context of present budget cycle and as projections across the FYDP.

In responding to studies, analyses, and data calls initiated at all levels of the administration, and by the Office of Management and Budget (OMB) and Congress, DoD often requires access to stratified levels of information. For years, DoD had no definitive source of information that could be used to report on the size of its budget allocated to logistics. A prime example is the recurring tooth-to-tail analyses that require a sense of the size of the tail. Information from the Logistics Cost Baseline has been used to answer these types of inquires and to show the relative size of logistics activities.

METHOD

At the highest level, we have described the process by which both the past and current Logistics Cost Baseline were developed. Because the past approach is no longer viable, we describe in some detail the current method for identifying logistics costs. Two different approaches are used to determine direct funding and manpower resources; these are described in the following subsection.

O&M Expenditures for Logistics Programs

The OP-32 Budget Exhibit, Summary of Price and Program Changes, is the main document used by the Logistics Cost Baseline for identifying logistics resources. The OP-32s provide a summary-level report of price and program changes within the O&M appropriation. It displays a 3-year picture of expended (first year) and budgeted amounts (current and next year) for logistics programs that are either directly funded or indirectly funded through warfighter consumption. This display has proven useful because it provides line-item summaries by expense activities. Each expense activity, or line item, is described in sufficient detail to enable placement into the three Logistics Cost Baseline categories: supply, maintenance, and transportation.

The identification of logistics resources in this approach is subjective. Each line item is reviewed and, based on the item's description, tagged to one of the three logistics categories. The tagged results are then totaled by category and displayed by Service component.

To project estimated logistics costs in the FYDP, this approach calculates the percentage of total categorized logistics O&M costs in the current budget year. This percentage is then applied, with proportional escalation, to total programmed O&M funding for each FYDP out-year as a means of projecting logistics resources as a proportion of total O&M resources in future years.

Civilian and Military Manpower Expenditures for Logistics Programs

To determine the manpower resources within the current Logistics Cost Baseline, the DMDC database identifies the total logistics manpower. Because program elements are populated inconsistently within this database, total logistics manpower resources are determined regardless of PE.

The logistics job skill codes within the DMDC database are used to identify active and reserve military and civilian personnel with logistics jobs. Because the database only contains personnel information for the current year, personnel estimates for future years are calculated using the ratio of logisticians to the total manpower in the DMDC database for the most recent year. That ratio is then applied to the current-year data to estimate projected future years' total logistics personnel.

An average cost per logistics full-time equivalent (FTE) position is then developed by comparing total pay dollars to the number of people. Cost-per-FTE rates are then applied to the number of logistician to estimate total logistics manpower costs.

ASSESSMENT

Strengths

The strength of the Logistics Cost Baseline is its ability to provide accurate summary information on the costs of logistics for the operating forces within the budget years. Since its focus is on the operating forces, which comprise the largest and most cost-intense segments within DoD, Logistics Cost Baseline captures the preponderance of DoD-wide appropriated fund (O&M) expenditures on logistics-related functions. It also provides a means for predicting the levels of resources applied to these functions into the out-years of the FYDP. In addition, because it has been tested and refined over time, it provides a relatively uncomplicated and expeditious means of obtaining and reporting on summary logistics resource information.

Weaknesses

The weakness of this approach is that it is summary in nature and does not provide the capability to drill down into logistics segments to support specific forms of logistics analyses. The current data are neither characterized to specific forces

or specific elements of logistics, nor categorized to any extent that would allow analysis of the substantial logistics infrastructure. The current approach allows for trend and causal analyses at the aggregate level only; it does not consider appropriations other than O&M.

Finally, to identify out-year resources, this approach relies on a mathematical projection into the future that is based on current budget allocations, not programmed logistics investments. And, to determine logistics manpower resources, it requires source data from the DMDC database to determine the number of logistics workers. This step requires extensive mathematical manipulation and projection to estimate manpower resources.

Decision Support Needs

Because the Logistics Cost Baseline provides only summary, non-program-specific resource information, its utility for providing decision support is minimal. While some overall trend information results from this approach, and is helpful in the context of its intended uses, the data that it uses are not program or capability specific, so its usefulness in focusing management attention on resource domains associated with logistics investment planning, assessment, and allocation activities is limited, at best. From a logistics portfolio and capability area management perspective, data derived from the Logistics Cost Baseline does not provide the granularity or fidelity needed for use in the program and capability area resource analysis and decision-making process.

LESSONS LEARNED

The genesis of the Logistics Cost Baseline, which dates back to 1999, indicates a long-standing need for identification of logistics resources. Because logistics resources cover and are embedded in a broad array of activities across DoD, their identification at the detail, program, or capability level is not easily accomplished. Nonetheless, the Logistics Cost Baseline continues to serve its original purpose. It provides a practical approach for answering the continuing high-level questions associated with logistics costs throughout DoD. Yet, neither it nor the 2006 QDR Logistics Resource Baseline initiative were designed to identify the resources necessary to support logistics resource planning and allocation activities and the move to capability portfolio management. However, the Logistics Cost Baseline remains the most accurate and practical means available for reporting the relative scope of DoD logistics.

Chapter 3
Logistics Resource Baseline

BACKGROUND

In response to the 2001 QDR, DoD commissioned several initiatives designed to improve the effectiveness and efficiency of transporting and sustaining military forces. One of those central QDR initiatives was to restructure defense planning from a "threat-based" model to a "capabilities-based" model for the future.

The Logistics Resource Baseline initiative was undertaken in conjunction with the 2006 QDR. The initiative was led by OSD(PA&E), under the auspices of the Supply Chain Logistics Working Group (SCLWG), one of five QDR working groups under Integrated Process Team (IPT) #5. The initiative's objectives were the following:

- Improve visibility into DoD supply chain costs and performance.
- Build the foundation for continuous performance management.[1]

Initiative work was accomplished through a QDR working group. This OSD(PA&E)-led group comprised 49 members representing the Services, Defense Logistics Agency (DLA), U.S. Transportation Command (USTRANSCOM), U.S. Special Operations Command (USSOCOM), DUSD(L&MR), and Joint Staff (J-4). Logistics and resource communities were brought together within the group to take advantage of functional and resourcing capabilities. Initial project work began in January 2005 and concluded in the spring of 2006. While the group intended to deliver a repeatable baseline for use during POM08, it did not achieve that objective. Some of the reasons for failing to meet the objective are addressed below.

The working group's fundamental guidance was to develop a repeatable and verifiable resource baseline using current data and resourcing processes. It began work by developing business rules and definitions for categorizing supply chain logistics resources. It identified 9 categories (later expanded to 10), and then applied business rules and definitions for linkage to the President's Budget 2005 (PB05) FY05 programming data. The resource categories (appropriations) considered in the effort consisted of the following:

- Operations and Maintenance
- Research, Development, Test, and Evaluation (RDT&E)

[1] OSD(PA&E) Briefing*, Logistics Resource Baseline Version II*, March 20, 2006.

- Procurement
- Military Construction (MILCON)
- Military Personnel (MILPERS)
- Defense Working Capital Fund–Appropriated Fund Support.

PURPOSE

The purpose of the Logistics Resource Baseline was to improve visibility of DoD supply chain costs and performance, with the objective of delivering a repeatable baseline.[2] The actual method conceived by the working group for using the identified data was not specifically defined in the documentation available for this report. We can infer from anecdotal information that the baseline data were intended to be of sufficient detail to support logistics investment decisions, particularly, trade-space analyses; but, because the study did not progress to the point where the effort's potential was realized, no formally defined uses of the information were established.

METHOD

The working group's method was developed "on the fly," evolving incrementally during the course of the work. However, once formally developed, it was intended for codification as the means by which a repeatable logistics resource baseline could be established for future use. The Defense Acquisition University (DAU) Business Information Laboratory (BIL), a data warehouse for testing data concepts and approaches, was made available as a repository for Logistics Resource Baseline data.[3] The effort addressed only Service resources. Thus, Components such as USSOCCOM, USTRANSCOM, and DLA were not considered. It was envisioned that once the baseline was established, its scope would be expanded and maintained in the future through inputs from DoD component program and budget data sources, and aligned to its business rules.

[2] OSD(PA&E) Briefing to the 3-Star Programmer's Group*, IPT#5 Supply Chain Logistics Working Group Resource Baseline,* September 28, 2005.

[3] Interviews with initiative participants indicated that DAU's BIL was not ready for use by Service representatives when needed. Consequently, data analysis was turned over to OSD(PA&E) for direct input into their supporting data base.

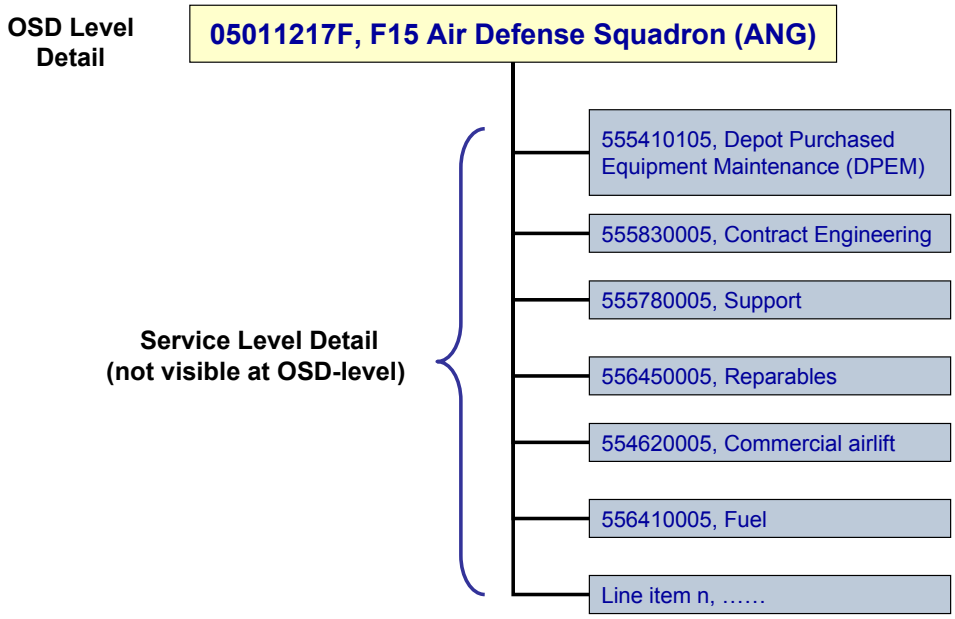
OSD(PA&E) initially provided a listing of logistics categories and definitions for the working group's review and concurrence. With minor adjustment, the group concurred with a single logistics categorization structure. That structure is shown below (see Appendix B for more detailed descriptions):

- Headquarters/Management/Training
- Maintenance
- Storage/Weapons Systems/Inventory Management
- Purchasing/Acquisition Infrastructure
- Transportation/Force Mobility
- Disposal/Activation/Deactivation
- Inventory/Procurement
- Combat Service Support
- Shore Installation/Base Operations Support, or BOS (the 10th category added during the project)
- Other (all logistics resources not identifiable to other categories).

Once the categories were established, OSD(PA&E) identified and provided Service teams approximately 1,000 OSD-level, logistics-related programs, each identified by its PE code. These PEs were identified from the PB05 FYDP programs of record, and selected for logistics relativity through a key-word database search on initiative logistics categories and their descriptions. Each PE was then provided to the cognizant Service for validation and further analysis.

Because each OSD-level PE represents a roll-up of individual Service programs that are not visible to OSD, Service analysts next broke down each OSD-level PE to individual Service-level PEs, or line items. Figure 3-1 portrays a one-to-many relationship between an OSD-level PE and Service-level line items.

Figure 3-1. OSD PE Relationship to Service Programs



This effort resulted in identifying approximately 9,500 individual Service line-items categorized as logistics. Table 3-1 shows a rough approximation, by Service, of total line items and those identified as logistics.

Table 3-1. Total Service Line Items vs. Logistics Line Items

Service	Total line-item count	Logistics line-item count
Air Force	~17,000	~4,000
Army	~12,000	~3,500
Navy/Marines	~11,000	~2000

Source: OSD(PA&E), *Logistics Resource Baseline Version II,* Briefing, March 20, 2006.

The Services then tagged each line item to a logistics category. With certain appropriations (such as MILCON), resources were immediately identifiable to a logistics category. In other cases (such as with O&M), subjective analyst review was necessary. The tagged data were then returned to OSD(PA&E) for integration. Table 3-2 shows the results for each Service. These results include all resource categories identified above as well as active, reserve, and national guard components.

Table 3-2. Logistics Resource Baseline Results (in $000s)

	Function	Air Force	Navy	Army	Marines	Total
1	Headquarters/Management	$534,299	$101,284	$185,663	$16,353	$837,599
2	Maintenance	$14,895,396	$6,321,631	$3,299,078	$542,223	$25,058,328
3	Storage/Inventory Management	$217,177	$863,737	$529,845	$0	$1,610,759
4	Purchase/Acquisition	$59,419	$768,299	$120,413	$0	$948,131
5	Transportation/Force Mobility	$2,897,634	$206,667	$976,369	$37,880	$4,118,550
6	Disposal/Activation	-$376	$220,748	$172,671	$0	$393,043
7	Inventory/Procurement	$1,681,195	$1,250,593	$10,676,905	$245,023	$13,853,716
8	Combat Service Support	$140,923	$3,260,675	$1,276,871	$79,891	$4,758,360
9	Shore Installation/BOS	$445,562	$1,135	$2,422,550	$974,719	$3,843,966
10	Other	$737,291	$535,989	$8,051,544	$9,907	$9,334,731
	Total by Services	$21,608,520	$13,530,758	$27,711,909	$1,905,996	
	Grand total					$64,757,183

Source: Data from working papers and other documents collected during the course of report analysis.

ASSESSMENT

Strengths

The strength of the Logistics Resource Baseline effort is its clear illustration of the Services' ability to put detailed data into logistics resource information, which would be extraordinarily useful if it could be harnessed and applied in a DoD context. Although less summary and therefore less reportable and useful than the Logistics Cost Baseline, the Logistics Resource Baseline provides additional resource categories beyond O&M. It also provides a more detailed view of individual Service-level programs (primarily by appropriations-detail category) that comprise the overall OSD program. This information is potentially useful, in that—with Service-level involvement—the capability for additional insight into program resources is evident. In addition, it may provide a useful framework for further logistics resource categorizes. The Logistics Resource Baseline effort also has provided useful lessons for follow-on logistics resource-to-capability identification efforts.

Weaknesses

The main weakness in this approach is that it relies on each Service to develop and apply its own definitions and business rules to the resource categorization process. As a result, it lacks uniformity and contains no definitive structure that would allow for validation of the data integrity.

Additionally, the Services have varying levels of resource visibility. For example, the Air Force, which has a robust system for resource identification, mapped its

Element of Expense/Investment Code (EEIC) construct to aid in identifying logistics resources.[4] The other Services relied primarily on the assigned analyst's subjective judgment. For example, some analysts routinely used line-item titles and definitions to make the mappings. When no category seemed to apply, they often selected "Other."

In addition, we found that sustainability of the Logistics Resource Baseline must be considered a weakness. First, refreshing the baseline data every year is a time consuming endeavor, primarily because program of record data changes more frequently, so changes must be tracked and identified continuously. Also, because uniformed Service analysts are often key participants in many of the ongoing PPBE activities and they rotate on a regular basis, the annual maintenance required to support the baseline data could become problematic due to the loss of institutional knowledge.

As a result of the lack of structure inherent in this effort, we observed several inconsistencies within the data. Although not comprehensive, some examples are described below (the example data are available in Appendix C). These inconsistencies indicate a need for common terms and definitions, and further refinement and standardization of business rules prior to any follow-on efforts. Without consistency across the Services, resource analysis will not be easily accomplished.

Resource Category (Appropriation) Inconsistencies

Inconsistencies in resource categories indicate the Services used different business rules in matching logistics programs to appropriations. We show some examples below:

- The Army and Air Force categorized $6.0 billion and $5.4 billion, respectively, of $12.9 billion to the Procurement appropriation. In contrast, the Navy and Marine Corps categorized $1.4 billion and $0.2 billion, respectively, to Procurement. These figures indicate that the Navy and Marine Corps used significantly different mapping business rules when identifying their Procurement programs.

- The Army categorized $10.1 billion of $10.8 billion to the RDT&E appropriation, with the other Services accounting for the remainder. This finding suggests another significant difference in the Services' interpretation of RDT&E.

- About $14 billion within the O&M appropriation is missing when compared to OP-32 budget documentation.[5] This situation indicates that the Services' business rules were probably too restrictive in capturing total O&M logistics resources.

[4] Air Force uses EEICs to link programs to budget formulation and execution. Each code is defined to reflect specific functional categories that integrate programmatic segments into unique resource categories.

[5] Estimate was derived through comparison to the Logistics Cost Baseline.

LOGISTICS CATEGORY INCONSISTENCIES

Inconsistencies in logistics categories suggest the Services used different business rules for identifying and placing programs into the 10 logistics categories, or were hampered by an inability to break the program data down into more useful sub-categories. The following examples illustrate this situation:

- The Army had $2.4 billion of the $3.8 billion within the BOS activities. In contrast, the Navy identified $1.1 million in BOS. Clearly, these Services used different rules to identify resources in this logistics category.
- The categorization of Maintenance resulted in significant variation among the Services. The Air Force, Navy, Army, and Marine Corps identified $10.6 billion, $6.2 billion, $3.2 billion, and $0.5 billion within the O&M appropriation, respectively. These amounts appear inconsistent when considering the current operational requirements of the Services.
- The $8.0 billion in "Other" by Army shows significant inconsistency in definition understanding and application.

Decision Support Needs

While the Logistics Resource Baseline initiative provides a more detailed picture of logistics resources, the data are not uniform and do not provide a definitional structure with which to understand and support any type of review of logistics investment. The initiative's utility in supporting decision making, while more detailed in certain areas than the Logistics Cost Baseline, still is disjointed and relies too heavily on Service acquiescence for detailed analyses. From a logistics portfolio and capability area management perspective, the Logistics Resource Baseline data do not provide the details or fidelity required by an effective decision-making process.

LESSONS LEARNED

The first and perhaps most critical component needed to effectively link resources to capabilities is a clear, up-front statement on how the information will be used. Understanding the desired output will in large part determine the scope and depth of the input, such as determining what data domains are relevant to achieve the desired output. Developing an effective plan of action to capture and link resource data to capabilities requires a clear understanding of how the data will be used. What types and depths of analysis are anticipated? At what levels will the data be used? To what extent will the data be used: executive decision making or technical analysis?

A structural context is necessary to support any resource-to-capability linkage effort. Structure refers to a clear determination of what data need to be collected. The logistics resource domain is large and multivariate, and it is often highly integrated

with other, non-logistics resources with obscure definitional boundaries. Thus, a clear, precise definition of logistics would bound the effort and ensure that the correct data are being collected for decision making.

In addition, an effort must be made to clearly define terms and references. The Services collect and aggregate data in different ways. Their operating terms and references, which characterize their operating processes in the PPBES context, are not uniform. To provide an output that is uniform and consistent, we must use terms and references that allow construction of the input data in the same manner.

Along with providing a structural and definitional architecture, up-front decisions must also be made regarding the depth and breath of data to be collected. For example, the current Logistics Cost Baseline collects O&M data on logistics programs for summary reporting. Decisions must be made on the relevance and need to capture other logistics and logistics-related resource data, such as logistics resources in the procurement accounts and non-O&M logistics in RDT&E and other appropriations.

In summary, a precise unambiguous business rule construct that links its logistics structure and definitional architecture is lacking. Because such a construct has not been established, DoD's terms, references, and values vary widely depending on Service, and among components. For instance, the Joint Staff defines programs one way, while the Services define them another, and DoD makes still a third characterization. These same "logistics" programs will be organizationally, functionally, and financially executed differently within the Services. An effective resource-to-capability linkage will require clear definitions of functional and organizational domains, and what is included in the large set called "logistics."

Chapter 4
JCA Mapping to Resources

BACKGROUND

In May 2005, the Secretary of Defense directed the establishment of 21 JCAs across DoD.[1] At the same time, OSD(PA&E) was tasked to provide a uniform process for relating JCAs to resources and "to the program and budget databases as appropriate prior to the FY08–13 POM cycle." To accomplish this task, the PEs included in OSD(PA&E)'s Defense Programming Database–Data Warehouse (DPD-DW) were mapped to the original 21 JCAs in May 2006. In August 2007, and in response to a tasking by the Deputy Secretary of Defense Advisory Working Group (DAWG) to realign the original 21 JCAs into a more integrated set that better supports portfolio management, OSD(PA&E) remapped the resources previously aligned to the 21 JCAs to the smaller set of 9 JCAs that were developed within the DAWG-mandated realignment effort. Data within the DPD-DW were updated to reflect the new JCA construct. While revised JCA-to-resources linkages were available through DPD-DW, those linkages remain in the developmental stage until the JCA realignment is completed in late 2007 or early 2008.

In its first iteration, the JCA mapping focused on programs associated with forces, thus excluding many of the logistics functions associated with infrastructure, such as central logistics—an area with significant logistics investment. In the second mapping of realigned JCAs, the infrastructure programs were included. While the results differed, the underlying approach did not.

PURPOSE

The purpose of the JCA mapping effort was to provide senior leadership with resource information for strategic decision making. By incorporating and structuring the results into the DPD-DW and the FYDP database, OSD(PA&E) was able to provide a consistent source for JCA-based resource information across DoD. Identification of resources to JCAs provided the "beginnings of a common language to discuss and describe capabilities across many related Department activities and processes."[2]

[1] Secretary of Defense Memorandum, "Operational Availability (OA)-05/Joint Capabilities Areas," May 6, 2005.

[2] Ibid.

METHOD

Mapping the Original JCAs

The OSD(PA&E) effort to map the original 21 JCAs to resources began with an assessment of PEs in the FYDP database.[3] Because JCAs were developed from the Combatant Commander point of view, only forces-associated PEs were identified for mapping. Those PEs, each representing a single program and its resources, were then mapped to JCAs. Since the focus was on forces-related PEs, other PEs associated with non-forces programs, such as infrastructure, were not included in the mapping effort. This resulted in approximately half of DoD's total obligational authority (TOA) being excluded from the effort.[4] Listed below are the original JCAs.

- Joint Force Generation
- Joint Force Management
- Joint Battlespace Awareness
- Joint C2
- Joint Net-Centric Operations
- Joint Interagency/IGO/NGO Coordination
- Joint Protection
- Joint Logistics
- Joint Homeland Defense
- Joint Public Affairs Operations
- Defense Support of Civil Authorities.
- Joint Global Deterrence
- Joint Shaping
- Joint Stability Operations
- Joint Information Operations
- Joint Access and Access Denial
- Joint Special Operations and Irregular Operations
- Joint Land Operations
- Joint Maritime/Littoral Operations
- Joint Air Operations
- Joint Space Operations

The actual process of mapping PEs to JCAs was subjective. After identifying all forces-related PEs, each PE was reviewed using a database search tailored to key words and phrases within the JCA definitions to ensure consistency throughout the mapping process. Next, the keyword search results and remaining unmatched PEs were reviewed to determine how each PE contributed to individual JCAs.

[3] The FYDP is the authoritative source of programming information for DoD.

[4] OSD(PA&E) FYDP Improvement Project, *DPD-DW Training Manual*, *Version 6.7,* September 2007.

Then, using a defined business rules set,[5] PEs were individually mapped to JCAs. The business rules allowed for the matching of a single PE to up to five JCAs. When the mapping was completed, the data relationships were integrated into the FYDP database and became visible through the DPD-DW.

JCA Rebaselining

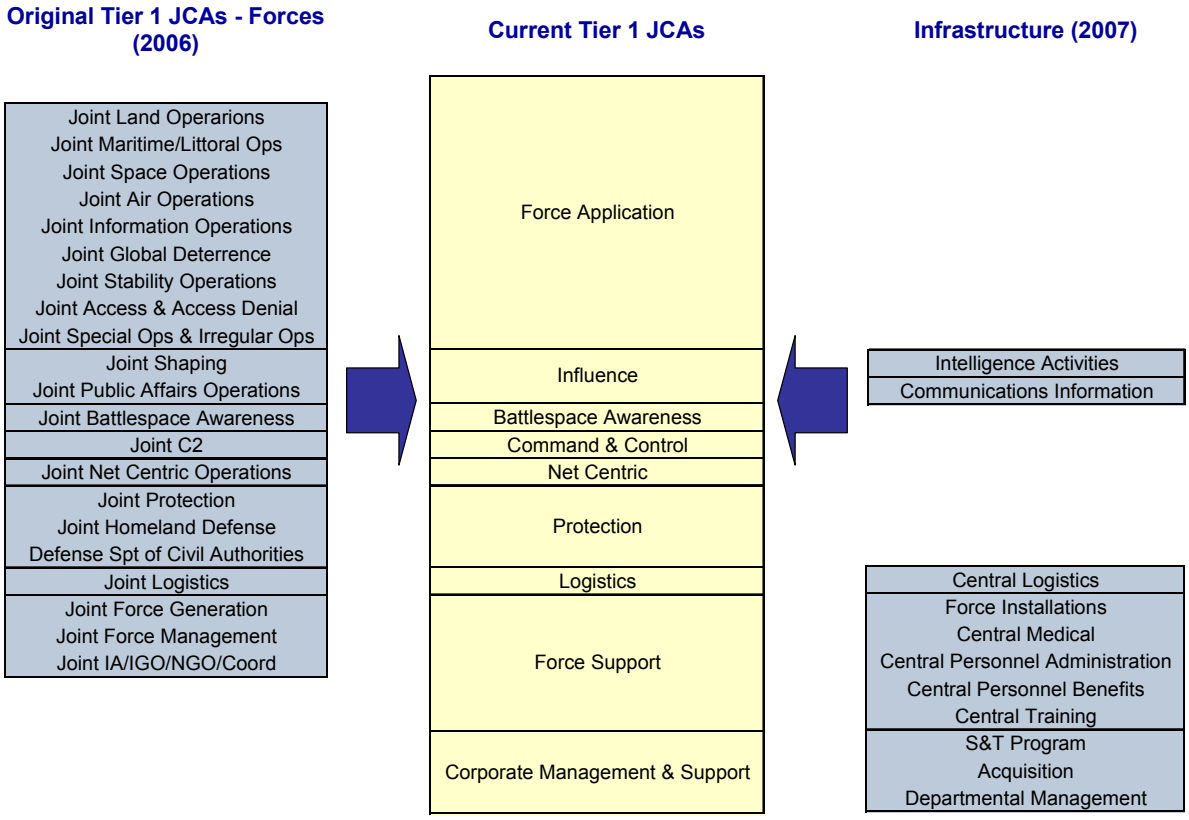
The JCA rebaselining initiative represents the first major change to the overall JCA structure since its inception. In this initiative, the 21 JCAs were redefined, realigned, and reduced to 9. It is intended that each of the remaining (rebaselined) JCAs, such as Logistics, would be further broken down into underlying tiers for greater visibility. This work is now underway. It is further envisioned that subsequent tier definitions under Logistics will likely be developed for the following categories: Supply Chain Operations, Operational Engineering, Operational Contracting, and Logistics Services.

Following the rebaselining of JCAs, the PEs were realigned to the new JCA structure. Rather than remapping all PEs, the realignment was performed in two steps. First, the old 21 JCAs were cross-walked to the new 9 JCAs. Then, the infrastructure-related PEs, which were excluded in the first mapping effort, were added based on each PE's infrastructure category.[6] Figure 4-1 graphically displays the crosswalk from the original JCA structure to the new structure. It also illustrates the linking of infrastructure PEs by category.

[5] JCA mapping business rules are contained in the *Mapping Joint Capability Areas to Resources Handbook,* OSD(PA&E), May 2006.

[6] The Force and Infrastructure Category (FIC) is a hierarchical coding scheme in which PEs are broken into two overarching categories: Forces and Infrastructure. PEs are assigned to the Forces sub-categories based on the primary mission area for which resources are planned and programmed. PEs are assigned to the Infrastructure sub-categories when planned and programmed resources are indirect or general in nature, and not attributable directly to a Forces program.

Figure 4-1. JCA Resource Mapping Methodology



Source: OSD(PA&E) FYDP Improvement Project, *DPD-DW Training Manual*, *Version 6.7,* September 2007.

The JCA data relationships that have been integrated into the FYDP database can be viewed using both standard reports and ad-hoc query capabilities within the DPD-DW. Data representing the original 21 JCAs and the rebaselined 9 JCAs are also in the system. The available reports and queries provide the following:

- Identification of the portfolio of programs that contribute to each JCA
- Program resources associated with each JCA
- Programs supporting multiple JCAs
- Results of the impact of changes to a program across multiple JCAs.

These data cannot be used for the following:

- Account for or make formal reports on the DoD program or budget because segments of TOA are counted multiple times
- Assess the sufficiency of DoD's capabilities in any area, which would require operational modeling to determine "how much is enough."[7]

DECISION SUPPORT NEEDS

Although OSD(PA&E) has mapped resources to JCAs at the aggregate level, more steps are necessary if the JCA construct is to achieve its primary objective of providing information for decision making based on capabilities. The JCA construct provides visibility into DoD's output, focusing on capabilities and matched to resource input information at the highest level. Resource management of capabilities, however, requires a more detailed, visible, and linked resource definitional structure with which to understand and apply the data for any type of detailed review of investments.

The utility of the current construct to support capabilities-based decision making is improved in the operational sense, but it still relies too heavily on aggregate resource information to provide the analytical facility required by resource managers and decision makers. Operational capabilities, and the requirements that support those capabilities, change frequently. These changes have a direct effect on resources. Requirements analyses, impact assessments, and trade-off decisions related to those and other capability area adjustments all require a level of resource detail information that is not achievable within the current PE-to-JCA mapping construct.

ASSESSMENT

Strengths

The primary strength of the JCA mapping construct is that its results are readily accessible across DoD. JCA-linked resource data are available on the DPD-DW, which is OSD(PA&E)'s single authoritative database for accessing and analyzing DoD strategic resource information.[8] The warehouse's robust ad hoc query capability, and standard reports provide the ability to view and report JCA-linked resources in many ways. And, access to the DPD-DW is available through a web-based SIPRNet interface accessible by all DoD components. The ability to apply consistent business rules and make available the resulting data on a widely available

[7] OSD(PA&E) presentation, *The Evolution of Resource Analysis and Data within the Department of Defense, Briefing for the Government Enterprise Integrators Group (GEIG)*, March 14, 2006.

[8] OSD(PA&E) FYDP Improvement Project, *DPD-DW Training Manual*, Version 6.7, September 2007.

data-warehousing site with a robust query capability is a significant strength of this approach.

Another important strength is that this approach employed a single set of business rules for resource mapping and applied them consistently to the JCA-to-resource mapping process. As a result, the JCA-to-resource relationships are reliable for comparison and analysis purposes. The use of consistent business rules for linking resources to capabilities is a fundamental requirement for all future logistics resource mapping and reporting approaches.

An additional strength of this approach is in the centralized means by which the data are maintained. The data can be manipulated and stratified to support future changes and DoD transformation. When the Secretary of Defense directed DoD to use JCAs as a management construct, OSD(PA&E) was able to apply the new construct to the FYDP database in a relatively short time. This approach also helped ensure the overall integrity of JCA-linked resources through a centralized approach to mapping of resources. The ability to adapt to evolving needs for resource information is an important positive attribute.

A final strength in the JCA mapping approach lies in its sustainability. The factors that enable this effort's sustainability are data availability, no requirement for broad consensus, and low manpower requirements. OSD(PA&E) is the owner of the database and the Services are required to update the data when new information becomes available. When mapping PEs to JCAs, there was no need for a broad consensus, which helped to shorten the time to accomplishment.

Weaknesses

The comprehensive nature of the mapping effort construct resulted in several data incongruities. For instance, when multiple JCAs and resources are linked, it is impossible to identify the JCA-specific resources among the linked JCAs. Also, in cases when a single PE contributes to multiple JCAs, it is not possible to identify what resource domains within the PE apply to a specific JCA.

Additionally, despite the flexibility built into the mapping model construct, it remains a time consuming and laborious process to re-map PE resources to JCAs within DoD's dynamic arena of constantly changing operational capabilities.

Since the data available present only a high-level view of programs, it can be classified into more than one category, making JCAs non-mutually exclusive from a resource perspective; PEs and JCAs could have a many-to-many relationship. The results would be asymmetries in the information, which could lead to miscommunication of the information obtained from the database and erroneous conclusions about what the data represent. It is not possible to sum resources in terms of JCAs, since one PE can be linked to many JCAs. Attempting to do so would artificially double or triple the available resources depending on the number of linkages between the PE and the JCAs. Table 4-1 illustrates the one-to-many

relationships among JCAs and their resources. PEs linked to multiple JCAs cannot currently be deconstructed within the mapping scheme to portray each JCA's portion of total resources.

Table 4-1. One-to-Many Relationship among JCAs

JCA	PE title	Resources[a] ($ in 000s)	Associated JCAs
Logistics	Combat Support—Offensive	270,811	Battlespace Awareness, Command and Control, Protection
Logistics	Tactical Support—Other Units	47,039	Protection
Logistics	Contractor Logistics Support and Other Weapon Support	144,689	None
Logistics	Corps Aviation	164,734	Force Application
Logistics	Corps Support Command	669,614	None
Logistics	Corps Engineer	237,229	Force Application, Protection
Logistics	Combat Support—Tactical Air Forces	1,794,266	Command and Control, Force Support, Protection

[a] Not actual amounts; for display purposes only.

Lack of Service participation in the mapping process is also a weakness of this approach. Many PEs cannot effectively be interpreted and assigned to JCAs except via the involvement of experienced subject matter experts. These experts reside primarily within the Services. Although attempts were made to increase the accuracy and decrease the subjectivity in the interpretation of resources through the use of technology, it could not be eliminated because it is largely based upon the interpretation of resources by a few individuals. This result presents a risk to users of the information. Knowledge of all Services' activities could be obtained more effectively through participation of a subject matter expert from each Service. The input and participation from all Services would greatly increase the accuracy of the mapping effort.

LESSONS LEARNED

The OSD(PA&E) PE-to-JCA mapping effort is an improvement over the other efforts because it makes a clear, up-front announcement about how the information will be used. It also employs an effective plan of action to capture and link resource data to capabilities. OSD(PA&E) provided the structural context necessary to properly enable the mapping of resources to capabilities. Moreover, it clearly stated what data would be needed to map and define the JCAs up-front, which bound the effort and ensured only relevant data were mapped.

The lack of Service involvement, however, remains a shortcoming in the JCA mapping construct. Service subject matter experts must be used to clearly articulate the data and agree to the terms and references. The Services collect and aggregate data

in different ways, and their operating terms and references, which characterize their operating processes within the PPBE context, are not uniform. To provide outputs that are uniform and consistent, future modeling efforts must include the Services to create the terms and references that allow mapping of the input data in the appropriate manner. Service cooperation and participation in the resource-to-JCA mapping process is critical. The Services maintain the core data at the baseline level and any effort to link resource data from PEs to JCAs will ultimately be unsuccessful without access to the Services' baseline data and their program experts.

Chapter 5
Conclusion

This report presents the results of an assessment of current and past efforts to identify and align resources to logistics. It also provides an analytical basis for beginning the process of improving and expanding DoD's ability to link programmed and budgeted resources to logistics capabilities, and to allow for greater visibility into program financing, facilitate trade-off management, and enable more informed decision making. In our assessment, we focused on three approaches for determining and reporting logistics resources. We profiled these approaches, identifying their purposes, objectives, sources of data, and outputs in an effort to understand them in some detail, and to determine their strengths, weaknesses, and lessons learned.

STRENGTHS AND WEAKNESSES

The three efforts we assessed were the Logistics Cost Baseline, the Logistics Resource Baseline, and the PE-to-JCA resources mapping effort. These approaches all have strengths, which we captured and will use in follow-on efforts. They also have weaknesses in their abilities to link programmed and budgeted resources aligned to logistics programs and capabilities at a level of detail that would provide greater resource visibility and enable more informed decision making.

The Logistics Cost Baseline has the ability to provide both accurate and summary information on the costs of logistics for the operating forces within the budget years. It also can predict levels of resources applied to these functions into the out-years of the FYDP. It is an uncomplicated and expeditious means of obtaining and reporting on summary budget-based logistics resource information. Its utility in providing detailed resource information for analysis that supports decision making is limited, however. The Logistics Cost Baseline provides only summary level, non-program-specific resource information, and that information does not provide the detailed data needed for use in the program and capability area resource analysis and decision-making process. As a result, its usefulness in focusing management attention on resource domains associated with logistics investment planning, assessment and allocation activities has serious weaknesses.

The Logistics Resource Baseline contained data on additional resource categories beyond O&M, which was the focus of the Logistics Cost Baseline. It also provided a more detailed view of individual Service-level programs, primarily by appropriations categories that comprise the overall OSD-level program. This information is potentially useful, in that it provides one level of greater resource detail, with the capability to obtained more detailed information on certain program resources. However, we found that this initiative's data were not uniform

and the initiative does not provide a definitive structure for understanding and applying the data for any type of review of logistics investment. We further found that, from a logistics portfolio and capability area management perspective, the Logistics Resource Baseline data do not provide the insight or fidelity needed for the decision-making process.

The PE-to-JCA resource mapping effort has the ability to maintain data currency and relevance in support of new management concepts such as portfolio management, primarily because of its centralization. It also appears to be a sustainable capability through its high availability of data, low requirement for broad consensus, and low manpower requirements. Although this mapping process has achieved its objectives of mapping resources to JCAs at the aggregate level and providing visibility into DoD's linkage of input resources to output capabilities at the highest level, DoD still has a requirement for greater uniformity and detail of associated data. It requires a detailed, visible, and linked resource structure with which to understand and apply its data for detailed investment review. We found the utility of the OSD(PA&E) construct to support capabilities-based decision making has provided for improvement in the operational sense, but it relies too heavily on aggregate resource information to provide the analytical facility required by resource managers and decision makers aligned with interrelated or supporting programs.

LESSONS LEARNED

While carrying out this assessment, we compiled many lessons learned. Although most of those lessons were related to the particular efforts that we were evaluating, we found several that transcended the individual initiatives.

First, a clear, up-front annunciation on how the information will be used is necessary. We found that understanding the desired output will, in large part, determine the scope and depth of the input to the extent of identifying what data domains are relevant to achieve the desired output. Developing an effective plan of action to capture and link resource data to capabilities requires a clear understanding of how the data will be used. What types and depths of analysis are anticipated? At what levels of detail will the data be used? To what extent will the data be used: executive decision making or technical analysis?

Next, a well-defined structure, as articulated through a precise, unambiguous set of business rules, is perhaps the most important ingredient for success in any follow-on effort. By structure, we mean a statement of what data need to be collected, and a clear, up-front definition of logistics, which would "bound" the resources-to-capabilities linkage effort.

The business rules should include clear articulation and agreement among the Services on logistics terms and references. The Services collect and aggregate data in different ways, so uniform and consistent terms and references must be developed at the outset to allow consistent construction of the input data. Front-end decisions

must also be made regarding the depth and breath of data to be collected and the distinction between logistics and logistics-like programs. Are programs as functionally diverse as Supply Management, Combat Engineering, and Facilities and Installation Management truly logistics programs? If so, then DoD needs a definitional architecture that lists the attributes of logistics programs, and provides a clear delineation for analysts tasked with aggregating data from those programs. An effective resource-to-capability linkage cannot be made without clear definitions of functional and organizational domains, and what is included in the large set called "logistics."

An additional lesson learned is the need for cooperation and participation among all DoD components, including the Services, agencies, and process owners. This cooperation and participation is critical. Since the Services maintain the core data at the baseline level, all efforts to link resource data to logistics will ultimately be unsuccessful without access to the Services' baseline data and the experience and knowledge of their program subject matter experts.

Finally, while not directly addressed in this report, the current OSD PE code structure does not provide the level of program detail necessary for effectively linking logistics programs to resources.

> Program Elements (PEs) in the FYDP no longer provide a relevant view of DoD outputs. There is an unclear relationship between PEs and programs of interest to DoD leadership and analysts.[1]

Even with well-structured business rules, identification of logistics within PEs is very difficult. We will address this topic in the business rules development phase of this work.

The conclusions and lessons learned that emerged during our assessments will help to guide us through the next phase of project work. That work includes the development of business rules for effectively linking resources to logistics capabilities in an integrated, repeatable process.

[1] Secretary of Defense Memorandum, "Program/Budget Data Integration," May 15, 2007.

Appendix A
Logistics Resource Visibility Assessment Data

Table A-1 shows the information gathered during our assessment of the three initiatives.

Table A-1. Assessment Findings

Initiative	Sponsor/organization	Purpose/objective	Approach	Reporting periodicity	Data sources	Inputs	Outputs	Domain	Applicability to analytic activity	Data granularity/accuracy	Timeliness to support need
Logistics Cost Baseline	DUSD(L&MR)	◆ Estimate programmed and executed O&M funding in prior and FYDP years ◆ High-level logistics O&M cost information for macro-level trend analysis and congressional reporting	◆ Three categories: Supply, Maintenance, and Transportation ◆ Four Services (active and reserve components) and Army/Air Force National Guards ◆ Labor costs to include CIVPERS and MILPERS (Active and Reserves)	◆ Annual	◆ OP-32 Budget Exhibits ◆ Defense Manpower Data Center (DMDC) database ◆ FYDP Database	◆ OP-32 line-item funding levels ◆ DMDC database logistics-coded billet quantities ◆ FYDP O&M program total by FY beyond current budget year	◆ Total estimated logistics funding (including manpower costs) for each Service in Supply, Maintenance, and Transportation	◆ Unclassified	◆ Trend analysis at the macro level	◆ Low: Provides summary cost data and depends on subjective category assessment and extrapolation for labor costs and out-year program estimates	◆ Data is timely to support need
2006 QDR Logistics Resource Baseline	OSD(PA&E)	◆ Improve visibility into DoD supply chain costs and performance ◆ Build the foundation for continuous performance management	◆ Initiative supported by working group consisting of Services, DLA, USTRANSCOM, USSOCOM, Joint Staff J4, and OSD ◆ Logistics categories developed by OSD(PA&E) with consensus from working group ◆ OSD(PA&E) identified approximately 1,000 logistics PEs; Services then mapped approximately 9,500 Service-level line-items within those PEs to 10 logistics categories ◆ Used DUSD(L&MR) Logistics Cost Baseline manpower estimates for manpower resources	◆ One-time effort	◆ FYDP database ◆ Service FYDP databases	◆ 2005 FYDP data from several resource categories: O&M, RDT&E, MILCON, and Procurement	◆ Total estimated logistics funding (excluding manpower costs) for each Service in 10 different categories	◆ Unclassified data attainable through restricted access data systems	◆ Provides logistics resource visibility to each of 10 categories at the macro level ◆ Requires additional Service-level detail data ◆ Results do not appear to support the objectives of the initiative	◆ Low: Services must drill down to gain further macro-level information ◆ Accuracy of information affected by different definitions of logistics in PEs across Services	◆ Long-term intention of the initiative was to produce annual log resource baselines; an annual update based on Service FYDP databases is deemed timely to support macros resource analysis
Joint Capability Area Mapping	OSD(PA&E)	◆ Align resource strategy to QDR's capability-based planning ◆ Provide a uniform process to relate JCAs to resources	◆ 2006: 21 JCAs ◆ 2007: 9 JCAs ◆ OSD(PA&E) mapped resources data to 21 JCAs within the DPD-DW in May 2006 ◆ Remapped resources to the current nine JCAs in August 2007 per Deputy Secretary of Defense Advisory Working Group tasking ◆ Divided JCAs into two attributes: Roles and Functions ◆ Addressed gaps in Roles and Functions ◆ Added Tier 2 JCAs to increase the level of resolution in highly aggregate Functions ◆ Created additional attributes (operating environment, effects environment, effects target) to enhance understanding of capability	◆ Ongoing	◆ FYDP database	◆ POM and BES data	◆ High-level estimates in nine different categories	◆ Unclassified	◆ Trend analysis at macro level ◆ Identification of the portfolio of programs that contribute to each JCA ◆ Provides overlapped view of program resources associated with each JCA	◆ Low: Provides highly summarized data by JCAs and Services	◆ Data are available to support some analytic needs on an ongoing basis; data are updated as FYDP database is revised

Appendix B
Logistics Resource Baseline Logistics Categories

This appendix amplifies the logistics categories[1] the Services used when assigning programs to Logistics under OSD(PA&E)'s 2006 QDR Logistics Resource Baseline initiative. These categories were developed through consensus among initiative participants and evolved during the course of project work.

HEADQUARTERS/MANAGEMENT/TRAINING

This category includes central logistics management headquarters and their supporting functions and initiatives. The following types of activities are in this category:

- Training
- Administration support
- Headquarters
- Logistics support
- Service support to DLA
- Air Mobility Command command and control
- Inventory control point operations
- Communications.

[1] OSD(PA&E) memorandum, "DoD Supply Chain Management Study, Objective 1, Logistics Resource Baseline," July 18, 2005.

MAINTENANCE

This category includes programs associated with centralized systems that provide depot and intermediate-level maintenance products and services to customers. These types of activities fall into the following areas:

- Depot-level reparables
- Platform maintenance
- Contractor logistics support
- Consumables
- Propellers
- Modifications
- Platform software maintenance.

STORAGE/WEAPONS SYSTEMS/INVENTORY MANAGEMENT

This category includes activities that manage supply and materiel inventories. The following example areas are in this category:

- Distribution depots
- Weapon system storage
- Material handling equipment
- War Reserve Material–Ammunition
- Ordnance activities
- Stored weapons maintenance
- Pre-positioned assets
- Chem-bio management.

PURCHASING/ACQUISITION INFRASTRUCTURE

This category includes programs associated with managing and executing the acquisition and procurement functions. The following types of activities are in this category:

- Cost of purchasing
- Army Materiel Command program management
- Joint Computer Aided Logistics System
- Planning, engineering, and design
- Program management
- Acquisition and management support.

TRANSPORTATION/FORCE MOBILITY

This category includes programs that support the transportation and supply of expeditionary forces. The following types of activities fall into this category:

- Second destination transportation
- Transportation platforms (C-5, C-17, and C-130)
- Bulk fuel
- Personnel expenses (travel)
- Cost of operations—support to Bosnia
- Air Force air control.

DISPOSAL/ACTIVATION/DEACTIVATION

This category includes programs associated with disposal, demilitarization, and deactivation of military platforms and equipment. The following types of activities are in this category:

- Demilitarization of ammunition
- Inactive aircraft storage and disposal
- Ship activation and deactivation.

INVENTORY/PROCUREMENT

This category includes programs associated with the purchase of logistics resources, such as initial spares and ship outfitting, procurement of material handling equipment, and procurement in general. It includes first destination transportation.

COMBAT SERVICE SUPPORT

This category includes programs associated with immediate- and operational-level logistics not included in the operational forces. The following types of activities are in this category:

- Echelons above corps theater logistics
- Fleet logistics support
- Mission other
- Logistics support.

SHORE INSTALLATION/BASE OPERATIONS SUPPORT

This category includes programs associated with installation support and operations. The following types of activities are in this category:

- Utilities
- Military construction.

OTHER

This category captures all programs not identifiable to the other nine categories. The following types of activities are in this category:

- Industrial preparedness
- Medical and dental data
- Commissary data.

Appendix C
2006 QDR OSD(PA&E) Logistics Resource Baseline Data and Observations

Table C-1 provides a summary of Service data gathered from the 2006 QDR Logistics Resource Baseline effort. It displays the result of the Service classification by resource (appropriation) and logistics categories. Highlighted boxes link to observations appearing in the report and below.

Table C-1. 2006 QDR OSD(PA&E) Logistics Resource Baseline Summary

Category ($Billions)	HQ Management	Installation/ BOS	Maintenance	Acquisition Purchases	Inventory Mgmt/Storage	Disposal	Transportation	Combat Service Support	Procurement/ Inventory	Other	***Totals***
MILCON											
USMC		0.365									0.36476
Navy											0
Army		0.352					0.05				0.40218
Air Force		0.269								0.03	0.29874
Total		*0.986*					*0.05*			*0.03*	***1.066***
MILPERS											
USMC											0
Navy											0
Army											0
Air Force	0.408		0.001	0.001	0.008		0.102			0.1	0.62
Total	*0.408*		*0.001*	*0.001*	*0.008*		*0.102*			*0.1*	***0.619***
O&M											
USMC	0.016	0.560	0.530				0.037	0.080		0.010	1.233
Navy	0.036	0.001	6.233	0.768	0.864	0.221	0.207	1.960		0.529	10.818
Army	0.185	2.070	3.194	0.110	0.445	0.013	0.907	1.274	0.130	0.027	8.356
Air Force	0.066	0.177	10.625	0.036	0.128	0.000	2.784	0.139	0.130	0.413	14.497
Total	*0.303*	*2.808*	*20.582*	*0.914*	*1.437*	*0.234*	*3.935*	*3.453*	*0.259*	*0.979*	***34.904***
PROC											
USMC									0.209		0.209
Navy			0.089					0.032	1.251	0.000	1.371
Army			0.017	0.009		0.095	0.000	0.001	5.876		5.999
Air Force	0.061		3.715	0.023				0.002	1.552	0.001	5.354
Total	*0.061*		*3.821*	*0.032*		*0.095*	*0.000*	*0.035*	*8.887*	*0.001*	***12.933***
RDT&E											
USMC									0.036		0.036
Navy										0.007	0.007
Army	0.000			0.002		0.064	0.019	0.002	1.958	8.025	10.069
Air Force			0.554				0.012			0.193	0.758
Total	*0.000*		*0.554*	*0.002*		*0.064*	*0.030*	*0.002*	*1.995*	*8.224*	***10.871***
DWCF											
USMC											0
Navy	0.065							1.269			1.33464
Army											0
Air Force											0
Total	*0.065*							*1.269*			***1.334***
Unknown											
USMC		0.050	0.012				0.001				0.063
Navy											0.000
Army			0.088		0.084				2.713		2.885
Air Force					0.081						0.081
Total		*0.050*	*0.100*		*0.166*		*0.001*		*2.713*		***3.029***
Totals	***0.837***	***3.844***	***25.058***	***0.949***	***1.611***	***0.393***	***4.118***	***4.759***	***13.854***	***9.334***	***64.756***

Source: Data from working papers and other documents collected during the course of our analysis.

(1) Army and Air Force categorized $6.0 billion and $5.4 billion, respectively, of $12.9 billion in the Procurement appropriation. In contrast, Navy and Marine Corps categorized $1.4 billion and $0.2 billion, respectively, to Procurement. These results indicate that Navy and Marine Corps mapping business rules were significantly different when identifying Procurement programs.

(2) $10.1 billion of $10.8 billion categorized in the RDT&E appropriation belongs to Army with the other Services accounting for the remainder. These data indicate a significantly different interpretation of RDT&E among the Services.

(3) Categorization of Maintenance resulted in significant variation among the Services. Air Force, Navy, Army and Marine Corps identified $10.6 billion, $6.2 billion, $3.2 billion, and $0.5 billion within the O&M appropriation, respectively. These amounts appear inconsistent when considering the current operational requirements of the Services.

(4) $2.4 billion of $3.8 billion within BOS activities belongs to Army. In contrast, Navy identified $1.1 million in BOS. Clearly, the Services used different rules to identify resources in this logistics category.

(5) The $8.0 billion in “Other” by Army shows significant inconsistency in definition understanding and application.

Appendix D
Abbreviations

BES	budget estimate submission
BIL	Business Information Laboratory
BOS	base operating support
CIVPERS	civilian personnel
COA	course of action
CPM	capability portfolio management
CSS	combat service support
DAU	Defense Acquisition University
DAWG	Defense Advisory Working Group
DLA	Defense Logistics Agency
DLR	depot level reparables
DMDC	Defense Manpower Data Center
DPD-DW	Defense Programming Database–Data Warehouse
DPEM	depot purchased equipment maintenance
DUSD(LM&R)	Deputy Under Secretary of Defense, Logistics and Materiel Readiness
DWCF	Defense Working Capital Fund
EAC	echelons above corps
EEIC	element of Expense/Investment Code
FIC	Force and Infrastructure Category
FTE	full-time equivalent
FYDP	Future Years Defense Program
GDF	guidance for developing the force
GEIG	Government Enterprise Integrators Group
HQ MGMT	headquarters management
IPT	integrated process team
JCA	Joint Capability Area
JCALS	Joint Computer Aided Logistics System

LRB	logistics resource baseline
MILCON	military construction
MILPERS	military personnel
O&M	operations and maintenance
OA	operational availability
OMB	Office of Management and Budget
OSD(PA&E)	Office of the Secretary of Defense, Director, Program Analysis and Evaluation
PB05	President's Budget 2005
PE	program element
POM	program objective memorandum
PPBE	planning, programming, budgeting, and execution
QDR	Quadrennial Defense Review
RDT&E	research, development, test, and evaluation
SCLWG	Supply Chain Logistics Working Group
SPG	strategic planning guidance
TOA	total obligational authority
USSOCOM	U.S. Special Operations Command
USTRANSCOM	U.S. Transportation Command