NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

THESIS

DLA/FEDEX PREMIUM SERVICE EFFECTS ON DEFENSE DISTRIBUTION INVENTORIES AND SHIPMENTS

by

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March 2006

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REPORT DOCUMENTATION PAGE			Form Approved OMB No. 0704-0188
Public reporting burden for this collection of information is estimated to average 1 hour per response, including the time for reviewing instruction, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington, VA 22202-4302, and to the Office of Management and Budget, Paperwork Reduction Project (0704-0188) Washington DC 20503.			
1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** March 2006	**3. REPORT TYPE AND DATES COVERED** Master's Thesis	
4. TITLE AND SUBTITLE: DLA/FedEx Premium Service Effects on Defense Distribution Inventories and Shipments			**5. FUNDING NUMBERS**
6. AUTHOR(S) Hill, Marichal L. and Pitts, Bobby			
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) Naval Postgraduate School Monterey, CA 93943-5000			**8. PERFORMING ORGANIZATION REPORT NUMBER**
9. SPONSORING / MONITORING AGENCY NAME(S) AND ADDRESS(ES) N/A			**10. SPONSORING / MONITORING AGENCY REPORT NUMBER**
11. SUPPLEMENTARY NOTES The views expressed in this thesis are those of the author and do not reflect the official policy or position of the Department of Defense or the U.S. Government.			
12a. DISTRIBUTION / AVAILABILITY STATEMENT Approved for public release; distribution is unlimited			**12b. DISTRIBUTION CODE**

13. ABSTRACT ***(maximum 200 words)***

This research reviews and evaluates the FedEx's Premium Service Program currently being used by DLA customers. The research will examine some of the benefits and costs of this co-locating of DOD warehousing and shipping operation managed by a commercial express transportation carrier. The research will view the possible benefits gained through commercial inventory and transportation practices by partnering a third party logistics service with the Defense Transportation System. DLA and FedEx have formed a partnership called DLA Premium Service. Premium Service is the only DoD warehousing operation that is co-located with and managed by a commercial express transportation carrier at FedEx main transportation hub. Premium Service System allows users to position materials in the Memphis facility for expedited delivery to the required destinations worldwide. All items are guaranteed, under contract, to be delivered to their continental U.S. (CONUS) destination within 24 hours and within 48 hours to outside of CONUS (OCONUS) to the major airports serviced by FedEx. Items will be delivered to the OCONUS final destination 24 hours of release from customs holding area at the airport. The service provides advance notification to streamline customs requirements of all OCONUS shipments.

14. SUBJECT TERMS DLA, Defense Distribution Depot, FEDEx, Premium Service			**15. NUMBER OF PAGES** 43
			16. PRICE CODE
17. SECURITY CLASSIFICATION OF REPORT Unclassified	**18. SECURITY CLASSIFICATION OF THIS PAGE** Unclassified	**19. SECURITY CLASSIFICATION OF ABSTRACT** Unclassified	**20. LIMITATION OF ABSTRACT** UL

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FEDEX PREMIUM SERVICE EFFECTS ON DEFENSE DISTRIBUTION INVENTORIES AND SHIPMENTS

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Submitted in partial fulfillment of the
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MASTER OF ARTS IN MANAGEMENT

from the

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ABSTRACT

This research reviews and evaluates the FedEx's Premium Service Program currently being used by DLA customers. The research will examine some of the benefits and costs of this co-locating of DOD warehousing and shipping operation managed by a commercial express transportation carrier. The research will view the possible benefits gained through commercial inventory and transportation practices by partnering a third party logistics service with the Defense Transportation System. DLA and FedEx have formed a partnership called DLA Premium Service. Premium Service is the only DoD warehousing operation that is co-located with and managed by a commercial express transportation carrier at FedEx main transportation hub. Premium Service System allows users to position materials in the Memphis facility for expedited delivery to the required destinations worldwide. All items are guaranteed, under contract, to be delivered to their continental U.S. (CONUS) destination within 24 hours and within 48 hours to outside of CONUS (OCONUS) to the major airports serviced by FedEx. Items will be delivered to the OCONUS final destination 24 hours of release from customs holding area at the airport. The service provides advance notification to streamline customs requirements of all OCONUS shipments.

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I. INTRODUCTION

A. DEFENSE LOGISTICS AGENCY

"The ultimate goal of our military force is to accomplish the objectives directed by the National Command Authorities. For the joint force of the future, this goal will be achieved through full spectrum dominance" (Joint Vision, 6). "Full-spectrum dominance means the ability of U.S. forces, operating alone or with allies, to defeat any adversary and control any situation across the range of military operations" (Garamone, 1). The military plans to invest and develop new military capabilities in for areas dominant maneuver, precision engagement, focused logistics, and full-dimensional protection of forces. In today's defense environment, the available funding for transformation of the military to meet the concepts of Joint Vision 2020 is shrinking each year. The Secretary of Defense (SECDEF) wants to achieve financial savings in Department of Defense (DoD) infrastructure through personnel reduction; base consolidation and closure; streamlining logistics inventory and outsourcing logistics functions. The funding saved in these areas will be used to invest in the next generation of weapon systems. "The U.S. Department of Defense logistics budget for 2001 was $83 billion" (Nevas, 1). The $83 billion accounts for many areas of logistics, which include procurement, warehousing, maintenance, and shipping.

The Defense Logistics Agency (DLA), centrally manages equipment, repair parts and consumables common to all four military services. The DLA system provides supply support, contract management services and technical and logistical services to all military services, DoD agencies, federal civil agencies and selected foreign governments. DLA manages over four million items at over twenty-two Defense Distribution Centers (DDC) located globally. These various depots are responsible for stocking the materiel, managing inventory levels, deciding materiel staging points, and final shipment of materiel to the war-fighter. The DLA system requires supply chain management to extend from the national supplier base through DLA warehousing function and to the

battlefield. But due to the variation in demand for these items, there is a significant amount of DLA budget resources used each year on the parts sitting idle as inventory at various sites all over the world.

The DLA provides worldwide logistics support to the military services through two primary means: the acquisition process and actual materiel management for the four services. . DLA is the Department of Defense's primary logistics provider, managing 89% of the common items used by the four services. It maintains an inventory valued over $80 billion dollars to support 32,000 customers making over 22 million requests per year (DLA, 1999). The Defense Logistics Agency is a complex organization with several functions, which include:

- Supports 1,312 weapon systems
- 23,000 personnel in 48 states and 28 countries
- $1.4 billion in distribution costs
- $600 million cost for disposal and stockpiling
- $70 million in Foreign Military Sales transactions

The Secretary of Defense (SECDEF) has required DLA to reduce operating infrastructure, reduce cost and provide more responsive service to the war-fighter. These mandated changes are targeted to come from "initiatives such as outsourcing, technological advancements and improving materiel reliability of end items provided to the services" (West, 2). The military must start using business practices and become smarter like private companies to increase efficiencies and squeeze out unnecessary costs within the department. The Department of Defense (DoD) leadership identified DLA's supply chain a opportunity to make changes and try commercial practices.

> A supply chain is a network of facilities and distribution options that performs the functions of procurement of materiels, transformation of these materiels into intermediate and finished products, and the distribution of these finished products to customers. Or a supply chain can be described as a network of facilities that procure raw materiels,

> transform them into intermediate goods and then final products, and deliver the products to customers through a distribution system.
>
> (Lee, H.L and Billington, C, 1995)

B. FEDERAL EXPRESS CORPORATION

Federal Express Corporation (FedEx) provides an integrated transportation, information and logistics solutions to their customers. Federal Express accomplishes its logistics service by using an extensive fleet of aircraft, trucks and vans to provide a synchronized on-time next day delivery services. Fred Smith identified the tremendous difficulty in getting packages and other airfreight delivered within one or two days by using passenger aircraft system. Mr. Smith identified a void in normal small package delivery business that could not be supported by the U.S. Postal Service (USPS) or United parcel Service (UPS) at that time. FedEx quickly grew to become world's largest express air-cargo firm. Today, FedEx operates several supply chain management services, which include FedEx Ground, FedEx Freight, and FedEx Supply Chain Services.

C. PARTNERSHIP

DLA and FedEx formed a partnership called DLA/FedEx Premium Service. Premium Service became the only DoD warehousing operation that is co-located with and managed by a commercial express transportation carrier at FedEx's main transportation hub in Memphis, TN. Premium Service System allows different DLA customers (Military Services and Other Government Agencies) to pre-position materiel at the Memphis facility for expedited delivery to customers at destinations worldwide. With the FedEx service, items are guaranteed, under contract, to be delivered to the continental U.S. (CONUS) destination within 24 hours and delivered to locations outside of CONUS (OCONUS) locations within 48 hours. FedEx Corporation serves 220 countries worldwide. Federal Express Premium Service provides advance notification to foreign country customs offices to further streamline customs clearing requirements of materiel arriving at all OCONUS delivery locations. Premium Service allows the U.S.

government to leverage on the business practices of the Third Party Logistics Provider (3PL) to satisfy requirements normally placed on the Defense Transportation System.

The Premium Service operation grew from 279 issues in FY95 to over 240,000 issues in FY01. The operation currently manages over 3,587 line items stocked at the FedEx facility (DLA, 2001). Premium Service provides the end user with a real-time in-transit visibility capability that includes FedEx's 1-800 number tracking, web site, and connection to Defense Automatic Addressing System (DAAS) via the Global Transportation Network (GTN). Inventory visibility (current-on-hand balance) at the Memphis storage facility is only provided to the DLA and Service Item Managers (IM) and others authorized organizations. Item manager's have the ability to set stock level reorder points at the 3PL storage facility. Federal Express provides all the principal services that DLA and Defense Transportation System (U.S. Transportation Command) provide to the warfighter.

D. SERVICES

Federal Express operates an 85,000 square foot warehouse located in southeast Memphis, Tennessee for DLA and provides the following services to DLA:

- Receiving of materiel
- Storage of materiel
- Inventory management/real-time inventory visibility of service inventory
- Pick and Packing of materiel for immediate delivery to CONUS and OCONUS units within 48 hours.
- Worldwide Express Delivery Service to GCCs, providing support to component forces supporting the Global War on Terrorism (GWOT).

E. SCOPE OF THIS STUDY

We compare the effects of using DLA/FedEx Premium Services versus using organic military supply chain to perform logistics services. This thesis seeks to answer the following questions:

- What is the difference in the level of service and cost of operations when comparing FedEx Premium Service to other Defense Depot facilities?

- Does the use of a third party logistics provider reduce customer wait time and materiel transit time?

- Are there any functions that Premium Service cannot provide during wartime operations?

- Are the benefits both service and price of using Federal Express Premium Service Program (3PL) worth outsourcing some of traditional DLA supply chain functions?

F. THESIS ORGANIZATION

In order to provide a background to the commercial and military/government organizations, Chapter II describes the history of the government systems (DLA) and how this system is being augmented though the use of commercial practices (FedEx Premium Service). Chapter III discusses the methodology used for the analysis of the. Then Chapter IV presents the data obtained to answer the research questions. Chapter addresses the findings and their implications to DLA and FedEx. We will also provide recommendations for further research.

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II. BACKGROUND

A. HISTORY OF DEFENSE LOGISTICS AGENCY

The origins of DLA started during World War II; when a rapid military buildup required the rapid procurement of vast amounts of munitions and supplies to support the war effort. The main offices of the Army and Navy for commodities (petroleum products, medical supplies, and clothing) were co-located in an attempt to gain efficiencies of scale with respect to level of efforts in procuring materiel. In 1947, there were eight supply systems within the Army and eighteen supply systems within the Navy. After the passage of the National Security Act of 1947, the Munitions Board was created in an effort to reduce duplication among services supply channels and eliminate inter-service competition for resources. The Munitions Board laid the foundation for the creation of a single integrated agency which specialized in military materiel procurement.

The Munitions Board was not as successful as hoped in eliminating duplication within the services, the Defense Cataloging and Standardization Act of 1952 transferred Munitions Board functions to a newly organized Defense Supply Management Agency. In 1953 President Eisenhower abolished both the Munitions Board and the Defense Supply Management Agency to create one single executive office, which became the Assistant Secretary of Defense for Supply and Logistics.

Listed below are other significant dates in the forming of DLA:

- In 1955, central management of common military logistics support was introduced. SecDef appointed one of the three services as single manager for a selected group of commodities.

- In 1961, the establishment of a common supply and service agency known as the Defense Supply Agency (DSA). It was estimated that by consolidating operations were and reduced 3,300 personnel, which saved more than $30 million yearly in operating costs.

- In 1963, the DSA growth continued with the acquisition of the Army general depots at Columbus, Ohio; Memphis, Tennessee; Ogden, Utah; and Tracy, California, and the Navy depot at Mechanicsburg, Pennsylvania.

- In 1965, DoD consolidated most of the military services contract administration activities. Officials established the Defense Contract Administration Services (DCAS) within DSA.

- In January 1977, the DSA's name was changed to the Defense Logistics Agency (DLA). The SecDef placed DLA under the management, direction, and control of the Assistant Secretary of Defense for Manpower, Reserve Affairs, and Logistics.

- In 1986, the Goldwater-Nichols Reorganization Act identified DLA as a combat support agency and required that the Chairman of the Joint Chiefs of Staff approve the selection the DLA Director. The Goldwater-Nichols Act also directed SecDef to study the functions and organizational structure of DLA to determine the most effective and economical means of providing required services to its customers.

- In 1993, as a result of Base Re-alignment and Closure (BRAC), officials merged, realigned, or closed several DLA primary-level field activities. Specifically, they closed two of five contract management districts and Defense Electronics Supply Center. The Defense Distribution Depot(s) Charleston, SC; Oakland, CA and the Tooele Facility, UT; and Ogden, Utah were disestablished. Defense General Supply Center became Defense Supply Center (DSC), Richmond.

- In 1996 officials merged the former Defense Construction Supply Center Columbus, OH and the former Defense Electronic Supply Center Dayton, OH to form the DSC Columbus and closed the Defense Depot Memphis, TN.

B. HISTORY OF FEDERAL EXPRESS

Fred Smith felt that the airfreight industry was totally different and would not grow in unison with passenger service. Fred Smith noticed that freight movement was totally different from passenger movements. Finally, commercial airlines could not provide better than two-day delivery service, so they would not attract customers that

already received that level of service at much lower costs thru the trucking industry. Smith proposed a centrally located air cargo system serving both large and small cities, but more importantly the air service focused on package delivery and not travelers. The initial infrastructure of FedEx started in 1973 with Smith using small jets to carry less than 7,500 pounds of cargo at a time to selected cities. The air carrier's main sorting hub was located in Memphis, TN. This hub served as a transfer point for all packages traveling throughout the United States. All aircraft landed in Memphis by midnight and offloaded all packages for sorting. After the sorting process, packages were loaded back on to aircraft and flown out to the final destination.

In 1994, Federal Express updated its corporate identity and formally adopted FedEx as its primary brand name. In 2000, Federal Express renamed all major operating companies under the FedEx brand name worldwide. The family of companies, under FedEx Corporation includes FedEx Express, FedEx Ground, FedEx Freight, FedEx Custom Critical, FedEx Trade Networks, and FedEx Supply Chain Services. The FedEx Package System handles over five million and documents daily.

C. HISTORY OF DLA/FEDEX PREMIUM SERVICE

> As the military recognized that its logistics system (designed decades ago) was slow, complicated, redundant and too costly to meet global requirements of the modern military, DoD developed a logistics strategic plan, with the goal of developing a better, faster, more reliable system. The new logistics system would have to support a smaller, highly mobile, highly technological force with processes as efficient as possible
>
> (GAO report, NSIAD-97-28).

"DoD's logistic strategic plan integrated roadmap to support war-fighting strategy. The Focused Logistics plan indicated that senior Defense Department leaders were committed to reduce secondary inventories from $70 billion to $53 billion by October 2001" (West, 3). DoD also planned to reduce logistics response time by one third from its fiscal year 1996 first quarter average by September 1997, and to reduce the average age for backordered items from 75 days to 30 days by October 2001.

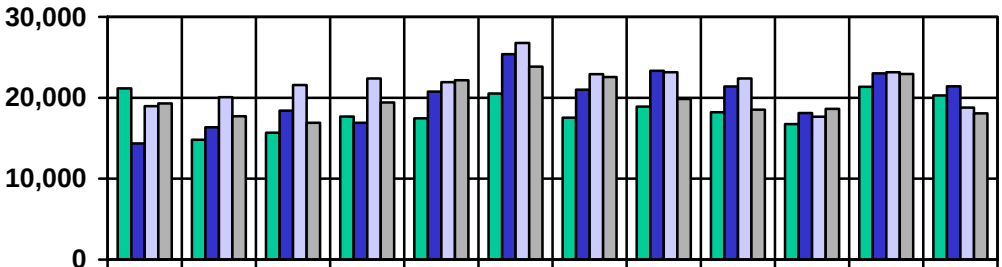
DoD's plans gave directions to improvements that were needed to reduce the costs of its logistics system. The objectives and goals of these plans were (1) reducing logistics cycle times, (2) developing seamless logistics system, and (3) reform logistics infrastructure. The DoD looked towards commercial practices as a means of streamlining for efficiency and lower costs while maintaining quality within the DLA and Defense Transportation System. DLA implemented several initiatives to reduce secondary inventories by using commercial best practices. "The agency developed strategy that focused on using commercial distributors to support military customers for hardware items that were used frequently and regularly and creating alternative methods for items that are more unpredictable and difficult to support" (GAO/NSIAD-00-30, page 4).

FedEx scope of business operations expanded to include Third Party Logistics and Supply Chain Management Services. FedEx realigned its freight and logistics company to perform services of warehousing and dedicated transportation pipelines. DLA awarded FedEx an initial five-year contract to warehouse materiel formally stored at the closed Memphis Defense Depot. As this relationship grew, DLA and FedEx formed a partnership called DLA Premium Service. Premium Service is the only government and contractor partnership where a DoD warehousing operation that is located with and managed by a commercial express transportation carrier. FedEx Premium Service allows users the ability to position materiel in the Memphis facility for expedited delivery to destinations worldwide. All materiel shipped through the program is guaranteed to be delivered to continental U.S. (CONUS) destinations within 24 hours and 48 hours to locations outside of CONUS (OCONUS).

The service provides advance notification to streamline customs requirements of all OCONUS shipments to expedite delivery to customers.

The Premium Service operation handles materiel that range in a variety of sizes from less than one pound up to 150 pounds, and range in size from 2 inches long by 2 inches wide by 1 inch tall to 165 inches total length and girth combined with no one side exceeding 119 inches. Some Large items and bulk materiel range in weight from 151 to

1,500 pounds; materiel weighing above the 150 pound threshold, are moved via FedEx Ground for shipments within CONUS unless item requisitioner specifically requests air transportation as the mode for delivery.



	OCT	NOV	DEC	JAN	FEB	MAR	APR	MAY	JUN	JULY	AUG	SEP
FY99	21,149	14,830	15,700	17,692	17,470	20,525	17,537	18,907	18,214	16,760	21,365	20,293
FY00	14,363	16,354	18,423	16,922	20,757	25,393	20,997	23,351	21,385	18,123	23,026	21,410
FY01	18,965	20,079	21,565	22,386	21,920	26,775	22,917	23,164	22,378	17,662	23,177	18,799
FY02	19,307	17,718	16,909	19,414	22,174	23,869	22,550	19,856	18,541	18,629	22,933	18,071

Figure 2.1 Total orders shipped from the Premium Service Facility FY99 – FY02

The Premium Service operation order shipped increased from 279 total issues in FY95 to over 239,000 total issues in FY02, as monthly shipped totals indicate in Figure 2.1. "The third party logistics provider currently manages over 3,587 line items stocked at the FedEx facility" (DLA, 2001). The requisitioning process is shortened through using the FedEx Chain Logistics (FSCL) system, which provides 24-hour telephone and electronic access. There is in-transit visibility capability that includes FedEx's 1-800 number, web site, and connection to Defense Automatic Addressing System (DAAS) via the Global Transportation Network (GTN). Inventory visibility is only provided to inventory managers and others that are authorized by the inventory managers. Inventory Managers set a stockage levels at the facility and once materiel reaches the reorder point a FedEx employee will contact the manager to initiate reorder of materiel.

D. PREMIUM SERVICE PROCESS

Federal Express Premium Service facility is a 85,000 square foot warehouse facility located in southeast Memphis, Tennessee. The location is approximately seven

miles from the Federal Express Main Sorting Facility, which is adjacent to the Memphis International Airport. Federal Express Premium Service Services provides the following services/functions to DLA under contract:

- Receiving of materiel
- Storage of materiel
- Inventory management/real-time inventory visibility
- Pick and Packing of materiel
- Worldwide Express Delivery Service

The facility operates 24 hrs a day 365 days per year; the operation has over forty employees to maintain around the clock operations at the facility. The work shifts are not the traditional eight hours day shifts. The workers in the warehouse operate on a staggered work crew shifts to more effectively adjust workload capacity to meet the scheduled departure time of materiel requisitioned through the DDC System. The reason for the staggering shift manpower is to align workforce with planned Defense Distribution Center (DDC), New Cumberland, PA batch processing requisition drops. The efficiency in the contractor operation is gained by minimizing and evenly distributing workload, which maintains a 97% on-time delivery rate of materiel. Orders are received in the customer service/inventory management division via several methods:

- Milstrip
- EDI
- Internet
- E-mail
- Telephone
- Fax Machine
- X-12 (Commercial equivalent to MILSTRIP/MILSTRAP)

Orders placed via fax machine are of the highest priority and are processed for immediate delivery 24 hours a day, even over weekends and holidays. The remaining requisitions that are received via other means will be processed on normal business days as set forth in the contract between DLA and Federal Express.

After receiving Materiel Request Orders, they are passed to the floor workers, who pick items from the warehouse rack storage system. Once items are pulled from inventory locations, the materiel is delivered to the packing and shipping area of the facility. The materiel will later be packed; bar-coded; and loaded in a trailer departure from the Premium Service location and delivery to the Federal Express Air Sorting Facility. The Premium Service facility uses two or three workers during early morning hours because of time lag between DDC requisition drops processed through DDC mainframe computer. The DDC mainframe computer is programmed to drop the requisitions in batches, normally three or four times daily.

The Premium Service customer service division of the organization provides 24-hour customer service support to military and other government agencies under the DLA contract. The main purpose of the division is to answer customer questions and provide actual warehouse floor validation for item managers and end use customers. Inventory management is conducted within the customer service division of the operation. Each National Stock Number item, stored at the facility, is inventoried once a year and reported to DLA or Service Agency that manages the particular item. Federal Express is required to maintain a 99% inventory accuracy level. Items with high inventory turnover rate are inventoried quarterly to reduce the possibility of lost or misplaced materiel. Inventories are normally conducted over the weekend (Saturday or Sunday), when there is a significant drop in the facility workload and the materiel movement is somewhat static. Federal Express provides DLA customers with a remote access for determining accurate and real-time status of the stored items in the facility receiving section.

DLA has no set criteria or threshold that materiel meet in order to be in the Premium Service program. DLA has contracted for a limited amount of space in the facility and the initial concept of the program was to store high demand and critical materiel for immediate expedited delivery to warfighters worldwide. During a site visit at the Memphis facility, it was noted that some of the materiel in the warehouse could be procured on almost any local economy worldwide and some materiel has never been requisitioned from the facility. Item managers have the ability to store any item that they want in the facility.

The Inventory Control Point (ICP) and individual service item managers control the replenishment and stocking functions of materiel stored in the warehouse. The FedEx Program Manager promises 24-hour dock to stock policy of received materiel this means after receiving the materiel from a shipper it is placed in the warehouse rack storage system within 24 hours (Cates). During the receipt process the materiel will be inspected, counted and entered into the inventory management system in the first 24-hours. The FedEx Automated Tracking System provides customers with real-time visibility and a high level of feedback to both item manager and war-fighter during movement through the transportation pipeline.

Premium Service's receipt processing operation is mostly a manual operation. The use of bar coding and scanning does not happen until the materiel is being processed for shipment to the end user. Once the initial receipt process is completed, the data is manually entered in to an inventory management system, which assigns the storage location based on matching National Stock Numbers. In situations where the location is full, the worker will find an empty warehouse location and annotates the location, and later inputs the new location in the inventory management system. The system used at the Memphis facility is not the most effective based on systems available in modern warehousing operations. FedEx plans to automate the receipt process by 2005 and reduce additional manpower by using technology.

III. ANALYSIS

A. INTRODUCTION

This chapter will outline the primary focus of our research. This chapter will introduce the primary research questions and present supporting materiel for our recommendations within chapter four. The information used to conduct this analysis was provided by the following: Defense Logistics Agency (DLA); FedEx Premium Service Contractor; Deputy Defense Depot Norfolk, VA, Mr. William Wisener; and various published GAO and various other professional articles.

The following are measurement questions that this research will cover:

a. What is the difference in the level of service and cost of operations when comparing FedEx Premium Service to other Defense Depot facilities?

b. Does the use of a third party logistics provider reduce customer wait time and materiel transit time?

c. Are there any functions that Premium Service cannot provide during wartime operations?

1. What is the Difference in the Cost of Operations and Level of Service When Comparing Fedex Premium Service to Other Defense Depot Facilities

The Premium Service Program was designed to reduce order- and - ship time and customer wait time (CWT) by using a commercially accepted practice in a military environment. "The idea of Premium Service came as a response to a National Performance Review objective to "**Reinvent DOD**" and became one of ten DLA reinvention labs to reduce logistics infrastructure without compromising readiness" (Gookin, 1). Presently, parts and materiel are assigned to the commercial facility based item manager's direction. Item Manager's may elect to utilize the third party logistics provider or use DLA's and Defense Transportation System shipment activities. Item Managers do have a defined method to determine which materiel to store at the commercially operated facility. The cost of receiving, storage and shipping cost was

compared based on data provided by the administrative contract manager, Mr. Jack Barmore, Defense Distribution Command. The actual cost comparison is provided in Figure 1 of this paper, the figure provides a cost roll-up of receiving, storage, and shipping functions on a cost per item basis. Level of customer service of both Defense Depots and Premium Service facilities will be observed to include overall shipment time consisting of: requisition receipt time; order pick time; packaging and final shipment time to customer. Various GAO reports and Premium Service Contract Performance reports are used in the analysis of service and operations between government methods and commercial methods.

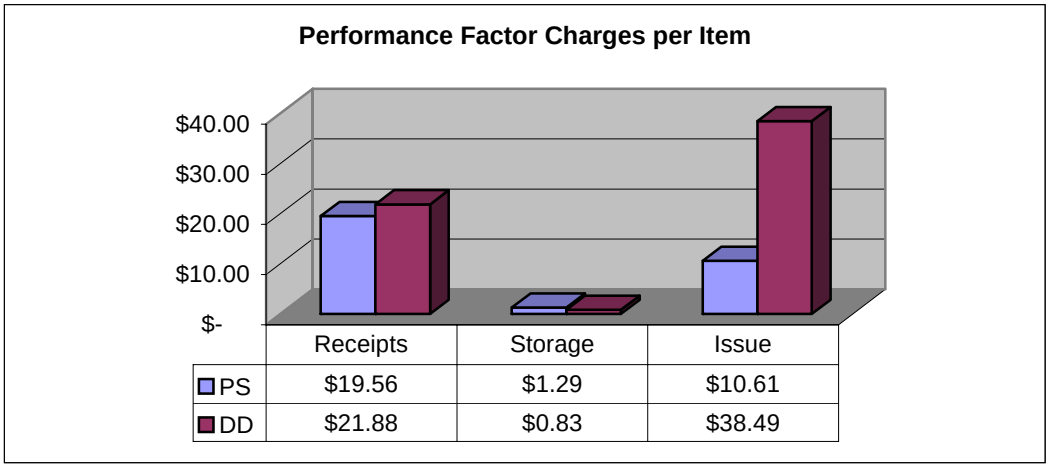
DLA and U.S. Navy materiel make up over 90 percent of the 3,000 plus items stored at the commercially operated facility. Item Managers using the program include DLA, Navy Inventory Control Points (NAVICPs), Naval Media Center, United States Army (USA) Armament and Munitions Command, USA Armament and Chemical Acquisition and Logistics Activity. Past performance of DLA and Defense Transportation Systems has caused item managers to rely more heavily on FedEx Premium Service for storage and delivery of materiel to the warfighter because "Military units that were engaging in rational but inefficient behaviours, such as hoarding spare parts and other supplies, to protect themselves from the risks associated with a slow and unpredictable process." (Rand Corporation, 219).

Inventory managers decision point on whether to use regular DLA depot storage facilities or Premium Service, are alike, each involves a balance of cost, service, and item usage or item turnover rate. "For warehousing and shipping decisions, the objective is to make a set of decisions that will minimize total costs and provide an acceptable –or economical- level of service at the expected demand or usage rate" (Fetter and Dalleck, p.1). Item managers use the following constraining factors for assigning materiel to the program: (1) materiel under 150 pounds of weight; (2) high materiel usage rate; (3) weapon system critical item and (4) potential requirement for expedited air express shipping. Premium Service program shortens actual time that materiel spends in the transportation pipeline and final delivery to the end user.

As R. Stansbury Stockton stated within his Basic Inventory Systems: Concepts and Analysis, "…every inventory decision should be based upon one or more forecasts for factors such as user demand and lead-time" (Stockton, p13). Recorded demand for materiel stored at the Premium Service facility is maintained by both Inventory Control Point managing the particular item and also, the third party logistics provider. The updated inventory data from the commercial facility is uploaded into the DLA inventory system daily. In a Rand Research Brief, it was noted that "…improved inventory performance (to include reducing customer wait time for materiel) means that customers spend less time waiting for parts. And repairs can be completed more quickly, which translates into higher equipment readiness rates." (Girardini and Peltz, 2) The maximum order, pick and delivery time for FedEx Premium Service is within 48 hours for shipments worldwide but for a DLA depot the total time for the same process is greater than 48 hours. Mr. William Wisener of Defense Depot Norfolk Virginia (DDNV) stated, "On average time from order processing ticket, order pick, order pack and delivery to shipping dock is about forty-one hours at DDNV" (Wisner). In the case of DDNV, materiel has only made it through the pick and pack stage during the first twenty-four hours of the depot filling the materiel request order. As stated by Mr. Wisener, requisitioned materiel does not enter the transportation pipeline (dispatched for the transportation department) until almost forty-one hours of receiving initial materiel request order at Defense Distribution Center, which passes the request to the appropriate depot to fill the requisition. Materiel requisitioned through Premium Service operation is more a real-time process; the materiel is shipped and delivered within 48 hours worldwide.

The costs prior to shipment of an item from either the Premium Service facility or Defense Depots are not significantly different. As depicted in figure 3.1, the cost of receiving and storage of materiel is similar, based on actual costs provided by the Defense Distribution Center (DDC) Contract Manager. The warehousing function costs at both facilities have the same metrics, which are materiel receipt, materiel warehouse stocking, facility overhead (labor and facility operation), and item inventory management. The issue cost for defense depots include picking cost (associated

manpower), packaging, and shipment through one of the various methods in the Defense Transportation System. The analysis of the variation within defense depots issue costs, mainly shipping, is driven by weight in all cases whether the shipper is the United States Postal Service, Less Than Truckload Carriers or USTRANSCOM (Air Mobility Command, Military Surface Deployment and Distribution Command, and Military Sealift Command). All three shippers use weight as a factor in determining shipment cost but Premium Service's price is $10.61 per item regardless of weight up 150 lbs, as negotiated in the Premium Service contract.



	Receipts	Storage	Issue
PS	$19.56	$1.29	$10.61
DD	$21.88	$0.83	$38.49

Figure 3.1 Defense Depots and Premium Service Costs of Receipt, Storage, and Issues

The 3PL provides the same service as the government during the receipt and storage phase of operations. The issue phase is significantly different when comparing issue costs per item. The issue phase costs to include shipment costs are significantly different because in the Defense Transportation System the item could go by multiple modes. The materiel shifting modes during shipment increases overall shipment costs that the end user pays. For example, an item could leave the depot via a LTL carrier, change to a sea carrier and finally back to a ground freight shipper. Multiple modes of transportation (time and cost) will be discussed in greater detail in the next section.

2. Does the Use of a Third Party Logistics Provider Reduce Customer Wait and Materiel Transit Time?

The transportation pipeline of materiel within the Defense Transportation System (DTS) can take several forms. Materiel is shipped from Defense Depots via three different methods: (1) United States Postal Service, (2) Less Than Truckload (LTL) shipper or (3) transportation expediter (i.e. FedEx or United Parcel Service (UPS)). All three materiel shippers have daily pick-up cycles from the particular depot. If the materiel arrives to the shipping dock after scheduled pick-up time, the materiel remains in the shipping department for an additional twenty-four hours until the next scheduled pick-up cycle. Depot managers realized this problem and identified this fact as a driver in total shipment time. "Coordination between all depot divisions: Information Systems Division; Production Division; and Shipping Division are required to reduce the average depot forty-one hour processing time from receipt of materiel request order to delivery of materiel and physical shipment of materiel." (Wisner). Research shows that DLA can improve service and reduce shipment time through using third party logistics services in some cases. The third party logistics provides a service that is faster than the Defense Transportation System when providing strategic and operational logistics movement globally. Once materiel is in theatre, services tactical logistics take over and movement is the same as if the materiel had originally moved via the standard Defense Transportation System. The difference is materiel spent less time during the strategic mode of delivery. GAO Report GAO/NSIAD-97-82 discussed later in this section will further show how time is saved by using a commercial shipper.

> The use of Premium Service for movements of government materiel to the end-user reduced materiel delivery time from an average of seven to two days versus the use of Defense Transportation System (DTS) for deliveries within CONUS" (Barmore). The stated number of days of receipt is based on customer materiel receipt time provided by DDC and FedEx PS contract performance manager, Mr. James Barmore of DDC. The significance of reduced in transit time by using third party logistics providers can impact end-customer's equipment readiness level and make a unit mission capable. GAO report on Inventory Management states "Third-party logistics services can (1) assume warehousing and distribution functions, and provide rapid delivery of parts and state-of-the-art information systems that would speed the shipment of parts between depots and field locations and (2) eliminate excess inventory and quickly

> initiating repair actions can reduce the amount of time parts are stored, improve the visibility of production backlogs and reduce the need for large inventory to cover operations while parts are out of service.
>
> (GAO/NSIAD-97-82, 20) .

"DOD's logistics systems must support a smaller highly mobile, high-technology force. Due to the pressures of budgetary constraints, DOD also must seek ways to make logistics processes as efficient as possible (GAO/NSIAD-97-82, 4)". The report showed that it took and average of 525 days to repair (includes shipment time to depot, repair facility processing and return ready for issue inventory) and ship the materiel to field units to repair weapon systems, shown in Table 3.2. "The Army estimated that only 18 days should have been needed to repair the item. The remaining 507 days were used to transport or store the parts or were the result of unplanned delays (GAO/NSIAD-97-82, 2). Two of the four recommendations were directly related using an outside Third-party logistics service to improve the logistics pipeline. The GAO report recommendations are as follows:

- Third-party logistics services can assume warehousing and distributions functions and provide rapid delivery of parts and state-of-the-are information systems that would speed the shipment of parts between depots and field locations.

- Eliminating excess inventory and quickly initiating repair actions can reduce the amount of time parts are stored, improve the visibility of production backlogs, and reduce the need for large inventory to cover operations while parts are out of service.

Pipeline segment	Average time (days)
Part preparation and shipment to the depot	75
Depot storage prior to repair	158
Depot repair time	147
Depot storage prior to issue	145
Total	**525**

Figure 3.3 DoD AVG. REPAIR PART TIMELINE

The use of third party logistics providers is currently being studied to determine whether the military should use outside commercial sources to improve efficiencies in the military's current logistics pipeline.

As stated in a Rand Report, "Each segment of the order-and-shipping process—from placing a requisition for an item to receiving the package and every step in between—was not only slow, but also unreliable. Order-and-ship times (OST) for orders varied widely; some orders were delivered in a few days, but others took weeks, even when the ordered items were in stock" (Girardini and Wang, 1). The commercial logistics provider reduced transit time by eliminating redundant processes in the supply chain pipeline (i.e. shipping, handling and stop or layover locations) DLA has followed some commercial practices to improve workflows within its distribution depots, sped up processing of Materiel Release Orders, packaged and directed shipments to reduce intermediate handling on post, and worked with commercial shippers to provide scheduled deliveries (Giradini and Wang, 4). By using FedEx Premium Service, the materiel is guaranteed to be shipped to the customer within a matter of a few hours from the Memphis facility. The materiel is pulled off the shelf and prepared for shipment through FedEx Transportation System and delivery is guaranteed to the customer within a designated timeframe. For any customer with a critical materiel requirement, the transportation advantages with commercial service are incalculable when the materiel is needed fast. "Army leaders had been so dissatisfied with the length and variability of performance that, in September 1999, they decided to contract with a commercial firm for air deliveries" (Borne, Leushner, and Robbins, ix).

The decreased numbers of intermediate points in the Premium Service operation also reduces total shipping time. Normally, materiel will move from the warehouse to the sorting facility and to the final destination; where it is placed in the hands of a designated government representative. The Strategic Distribution Report noted, "Distribution times were long, variable and undependable, due largely to inefficient processes, clogged ports, and a myriad of other problems. The result was that overseas bound materiel often took more than 35 days to get out of the United States" (Borne, Leushner, and Robbins, viii). Within the DoD Transportation system, materiel may change modes and shippers within

both the government and commercial shipping hubs and nodes. "The best distribution practices emphasize streamlined flows and a minimization of stops, queues, and handling, Defense distribution modes tended to suffer from significant delays as materiel sat in ports and transit hubs." (Borne, Leushner, and Robbins, viii) Also, GAO has noted, "higher defense transportation costs are driven by process fragmentation, duplication, and overlap within the component commands (Surface Deployment and Distribution Command (SDDC); Air Mobility Command (AMC); and Military Sealift Command (MSC)) and the need for the components to maintain mobilization capability" [GAO/NSIAD-96-60]. The use of a third party logistics provider that removes the duplication of effort within the government improved customer wait time, reduced order-and-ship time and created cost savings. "The implementation of Strategic Distribution has consolidated inventory at East Coast and West Coast locations, expansion of stock points closer to customers in Europe, establishment of new customers and routes for scheduled trucks, and using commercial logistics providers. These improvements will yield savings to taxpayers as well as better service to forces. DLA estimates that the above actions will save at least $120 million over the five-year period 2003-2007" (Borne, Leushner, and Robbins, ix).

3. Are There any Functions that Premium Service Cannot Provide during Wartime Operations?

The level of service as stated in the Premium Service contract Statement of Work did not identify any area of service that would be degraded even during wartime or contingency operations. FedEx Logistics Service has served as an intermediary in the storage and delivery function for DLA and other DoD services during Operation Enduring Freedom. In CONUS Premium Service operations, deliveries are made directly to the particular base or unit. In the OCONUS Premium Service operations, materiel is delivered to the specified country, clears customs and delivered a Military Post Office (MPO) for pick-up by a military service support representative in that particular country. During the start of Operation Enduring Freedom, "commercial carriers were hired to take on routes previously flown by military aircraft" (Borne, Leushner, and Robbins, xi).

FedEx Premium Service now manages the receipt, storage, inventory management, and shipment of materiel stored in the Memphis, TN warehouse facility. The functions that are provided by the third party logistics provided will not be affected by wartime efforts. "The unreliability of the military service caused many customers to turn to better – distribution modes, such as FedEx and Worldwide Express. Decreasing customer confidence was especially a problem for military air. The loss of customers contributed to the under use of military air cargo capacity and caused reverberations for the wartime readiness of air crews and ground elements." (Borne, Leushner, and Robbins, viii). FedEx Premium Service did provide the guaranteed level of service to the customer even during a wartime environment. The FedEx Premium Service can and has provided all functions that it was contracted to perform even during wartime and contingency operations.

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IV. CONCLUSIONS AND RECOMMENDATIONS

A. CONCLUSIONS

1. Third Party Logistic Providers Allow Significant Leveraging of Existing Infrastructure to Support the Mission of DLA

The commercial third-party logistics provider approach of Premium Service has been well received by the military customers. The delivery rates above 97 for all customers receiving required parts within the contracted timeframes worldwide. The 3PL's system of distribution has a reduced number of distribution points that materiel must transition through before reaching the warfighter.

2. Benefits of Using Premium Service Program is Worth the Associated Cost and Outsourcing of Core Business Functions of DLA and Defense Transportation System

Premium Service Program has shown that it can improve on DLA and Defense Transportation System's distribution functions to the end user customer. The Third Party Logistics Provider guaranteed delivery to the customer within 48 hours worldwide with no service degradation. The company's large infrastructure in both transportation assets and information systems provide an advantage and benefits DLA, Defense Transportation System, and warfighter.

B. RECOMMENDATIONS

1. Increase the Use of the Premium Service Facility as a Centralized Point for Critical Parts

Increasing the use of PS DoD would allow inventory stock points to be positioned at a centralized point. This could remove the requirement for storing safety stock at several de-centralized locations worldwide. The material being centrally located in the Memphis facility it can be shipped anywhere in the CONUS within 24 hours and 48 hours OCONUS. The service is equal or better than what the current DTS could meet. GAO identified areas where streamlining and outsourcing logistics functions in DoD's supply chain will save $120 M through the year 2007.

2. Leverage the Federal Express Logistics Services Infrastructure to Reduce Cost and Improve Service to the End User Customer

One of the major benefits that DLA/DoD gains is the Federal Express infrastructure. The network of daily scheduled flight network, real-time visible tracking service, guaranteed delivery are all services that the commercial provider is a core competency in and respected transportation expert. DoD does not have the resources or ability to provide this type of services to its customers at the low prices that FedEx does. After analyzing the data from a DLA warehouse and the price FedEx charges for premium Service is a significantly better deal based on cost and time to final delivery. It is noted that P.S. does not service as many line items as DLA, but just the cost per sq. ft. of storage area is cheaper from the commercial provider.

3. Create Standard Criteria for Materiel Stored at the Premium Service Facility to Better Utilize the 85,000 Sq. Ft. Facility for Storage of Mission Critical Parts

DLA and Service item managers should identify a specific matrix to identify critical and high inventory turnover materiel to be stored at the Memphis facility. Remove or dispose of dormant materiel from the Premium Service facility which has low inventory turnover rates or no demand over the past 30 months. Reduction of dormant materiel will allow for additional space available to store mission critical and high demand materiel.

Topics for Further Research

The following research topics warrant further study:

- Using optimization models to analysis what is the optimal demand rate and part's weight criteria to minimize cost of warehousing NSN items within a collocated commercial third-party logistics provider arrangement such as PS.

- Identify and capture lessons learned to determine if commercial outsourcing approach within the Premium Service program can be adopted and implemented to other functions in DoD's Supply Chain System.

Identify and capture lessons learned to determine if commercial outsourcing approach within the Premium Service program can be adopted and implemented to other functions in DoD's Supply Chain System.

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