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COLLOCATING AIR FORCE WEAPON SYSTEMS
INVENTORY WITH THE DEFENSE LOGISTICS AGENCY
PREMIUM SERVICE FACILITY

by

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Abstract

Currently, most Air Force managed assets are warehoused either at a Defense Logistics Agency (DLA) facility collocated with Air Logistics Centers or in retail base supply accounts. The level of inventory required partially depends on a computation based on average order and ship times. DLA, in partnership with Federal Express, operates a Premium Service facility collocated with the Federal Express hub in Memphis, Tennessee. Warehousing and distribution processes at this facility trim at least one day of order and ship time resulting in a potential of reducing Air Force wholesale inventories. This paper explores processes, considers eligible inventory types, and conducts a simple cost comparison for wholesale inventories. The author concludes there is potential for significant savings if the Air Force places high-value inventory at the Premium Service facility.

Chapter 1

Introduction

With declining defense budgets and the inherent responsibility as stewards of taxpayer dollars, the Services must continue to search for more efficient processes while assuring mission accomplishment. As a result of the Reagan military buildup and subsequent military drawdown, the Services have been tasked to right size based on new force structure and inventories. The Defense Management Report Decision 987 in 1990 directed Services to set specific inventory reduction goals.¹ The Air Force was tasked to reduce inventory level by 21 billion dollars over twelve fiscal years.² One way the Air Force has chosen to reduce costs but maintain warfighting capabilities in the logistics arena is by transitioning from a supply or inventory-based system to a transportation-based system. This paper explores the possibility of improving the average order and ship time (O&ST) of Air Force managed secondary items (spares) through the concept of collocating them with commercial carrier transportation hubs such as Federal Express' in Memphis, Tennessee. Though quantification is not yet a science in Air Force materiel management, Air Force spares value has been estimated in the range of 40 to 60 million dollars per day of inventory. With inventory values of this nature, collocating assets with commercial express carrier hubs may present an opportunity for significant savings.

Background

Air Force weapon system secondary item (spares) inventory requirements are computed by Air Force Materiel Command (AFMC) item managers (IMs). These assets are designated in the wholesale system through the use of budget codes. Budget code 8 delineates secondary items for replenishment while budget code 15 is for procurement of initial spares for a weapon system. These reparable assets make up over 90 percent of Air Force inventory value.³ Among many other factors, they utilize mean time between failure, condemnation, and average O&ST rates. These computations, conducted in a system known as the Recoverable Consumption Item Requirements System (D041), determine the quantity of spares necessary to support a weapon system at pre-determined and fiscally palatable in-commission rates. Obligation authority to purchase spares inventory is granted to AFMC through the Supply Management Activity Group (SMAG) of the Air Force Working Capital Fund (revolving fund) by Congress in the budget cycle. Customers buy parts from this revolving fund (SMAG) with directly appropriated Operations and Maintenance (O&M) funds. These funds replenish the SMAG giving it the capability of paying for repairs or replacing the unserviceable/condemned item when necessary. The cost of the item to the customer is determined in part by storage/shipping charges as well as the cost of maintaining the inventory.

If the transportation leg of O&ST could be reduced beyond current levels, the computation model should in turn reduce spares requirements, lower overall weapon systems support costs, and free O&M funds for other Air Force needs. The Secretary of Defense's Strategic Logistics Plan outlines his goals to dramatically reduce cycle times.⁴ Reducing O&ST is in direct support of meeting this goal.

The Air Force has recognized the need to reduce O&ST for several years and has taken dramatic measures to this end. For instance, the Air Force Deputy Chief of Staff for Installations and Logistics and his Board of Advisors made the conscious decision in 1996 to require all shippers to utilize commercial express carriers to move spares from warehouse to customers and from customers to the repair depots.⁵ As a result of this decision and subsequent policy implementation, the Air Force realized nearly \$800M in inventory cost avoidance over a three-year period.⁶ These savings took into account an inventory buy reduction as well as approximately a \$25M annual increase in transportation costs to support express carrier use. This is accomplished by reducing the transportation leg of the overarching O&ST and is possible through significant improvements in commercial carrier capabilities and reduction in transportation costs. For instance, some commercial carriers such as Federal Express boast a 98 percent plus on-time delivery rate while keeping customer costs relatively low.⁷ Another benefit using the commercial express carrier provides the Department of Defense is a guaranteed on-time delivery. In the event of a service failure (less than two percent), under the terms of the General Services Administration (GSA) contract with Federal Express (FedEx), the customer is refunded charges associated with the shipment.⁸

Notes

¹ Mattern, Virginia A, "Inventory Reduction: When Is Enough Enough?" *Air Force Journal of Logistics* 21, no. 2 (Spring 1997): 8-12.

² Ibid.

³ Ibid.

⁴ Fact Sheet, William Gookin, Defense Logistics Agency Support Command Subject: Premium Service Facility, 24 August 1998.

⁵ Minutes of the Air Force Logistics Board of Advisors held at Tyndall Air Force Base, Florida, 1 May 1996, 6.

Notes

⁶ Briefing, Headquarter United States Air Force, Directorate of Supply, Aircraft and Missile Support Division, undated.

⁷ Gookin, William, “DLA/FedEx Provide Premium Service.” *Dimensions*. (April/May 1998): 45.

⁸ *FedEx U.S. Government Contract Service Guide* (Memphis, TN, 1997), 23.

Chapter 2

Current Air Force Warehousing Processes

Currently, most Air Force managed assets are warehoused at either Defense Logistics Agency (DLA) warehouses or at individual Air Force bases. The following will examine the fundamentals of the wholesale (DLA) and retail (base) warehousing processes.

Defense Logistics Agency

The DLA is responsible for receiving, warehousing, and shipping of Air Force managed or repaired assets transiting each of the Air Force owned Air Logistics Centers (ALCs). Each ALC is charged with fiscal responsibility to manage their assigned share of the SMAG by implementing fiscally prudent policies with maximum support to the weapon systems. The ALCs use SMAG funds to pay DLA for receiving, warehousing, and shipping services heretofore referred to as “line charges”.

Following the typical asset through the supply pipeline begins with procurement from the vendor. Once the item manager determines buy requirements and funding availability, the order is placed with the vendor. The vendor may be directed to ship assets directly to the consumer (base) or in many cases, with shipping the asset to DLA warehouses at the ALCs. When receiving a shipment, DLA warehouses the item and charges a pre-determined discrete cost per item (line charge) determined by its physical

characteristics. For instance, DLA discriminates between medium bulk receipts and heavy/heavy bulk or hazardous material receipts.¹ These “line charges” are not assessed for each item received, but for each shipment. To elaborate, if a vendor ships ten items in a single shipment with the same national stock number in a carton with the unit of issue designated by the Air Force as “each”, DLA would assess a single line charge based on bulk or hazardous characteristic of the asset. If however, the same vendor shipped the same assets in ten separate boxes as ten distinct shipments, the Air Force would be charged for ten receipts. In addition to receipted shipments, DLA charges the Air Force in the same manner based on the same principles for issues or shipments.

An additional charge is assessed when DLA “issues” or ships an item. On and off base issues are discriminated between in line charge determination.² For unserviceable spares (returned from the consumer vice the vendor) or assets requiring modification, the IM will direct DLA through the AFMC wholesale system to issue the asset to an on-base repair facility. Since there is no commercial transportation required, the line charge for this issue is substantially lower than an off-base issue. DLA’s management information system recognizes and adjusts billing based on the different types of issues.

Once the item is repaired, the Air Force depot repair facility requests DLA re-warehouse with an additional receipt charge assessed. Finally, once a retail customer places a demand on the wholesale system, the item is either released automatically or flagged for item manager review and then released based on requisition priority. Depending on the point in the duty day the requisition enters the system and the priority of the requisition, the electrons could be “batched” for release later in the day or the next duty day. This presents a problem when trying to reduce O&ST and frequently results in

at least one additional O&ST day compared with the DLA Premium Service option. A comparison with Premium Service will be addressed in a later chapter. As mentioned previously, off-based issues generate additional line charges.

Line charges are standardized for all DLA Distribution Depots regardless consignment destination or origin. All line charges are assessed through the SMAG to the retail customer in the ultimate “selling” price of the asset. A Memorandum of Understanding between the Air Force and DLA requires DLA use commercial express carriers for transportation of most weapon systems spares. Excluded from this requirement are those consigned to hard to service countries/locations (e.g., Turkey, Diego Garcia) where customs or austere commercial service presents problems.³ Outlined next is transportation charges generated by the retail customer.

Air Force Retail Accounts

From a retail perspective, most base supply warehouses are managed as a Base Operating Support (BOS) function. Under this structure, all overhead costs associated with receiving and warehousing budget code 8 and 15 assets are borne by BOS and directly funded with O&M dollars. When an asset arrives from DLA or another base in the case of a lateral shipment, base supply receives, stores, or issues it to the customer (maintenance) with no charge assessed for overhead. The customer does however pay the price set in the SMAG including the line charges assessed by DLA. Once it is rendered unserviceable through weapon systems use, the customer returns it to supply for carcass value credit and it is immediately released from supply to the Traffic Management Office (TMO) for shipment. The TMO ensures proper packaging and ships the asset to the ALC (or contract repair facility) utilizing SMAG funds and commercial

express carriers.⁴ This shipment cost is also considered when determining the retail (SMAG) price of the item. Next, a commercial process for warehousing and distribution will be examined.

Notes

¹ Department of Defense. *Program Budget Decision, Cost of Operations and Customer Prices for the Defense Working Capital Funds*. no. 426. (Washington, D.C.: Office of the Under Secretary of Defense [Comptroller], 19 December 1997), 128-9.

² Ibid.

³ Headquarters USAF/Deputy Chief of Staff for Installations and Logistics, memorandum of understanding with Headquarters DLA/Director of Materiel Management. Subject: none, 1 October 1997.

⁴ Air Force Instruction 24-201, *Cargo Movement*, January 1999, 15.

Chapter 3

Federal Express Premium Service

The Federal Express (FedEx) Corporation operates a worldwide warehousing and distribution system focusing on time-definite delivery of small to medium sized packages. While most of their business involves packages weighing less than 150 pounds, they are capable of moving much heavier packages to most of the world. Most packages transiting through the continental United States (CONUS) transit are sorted through the FedEx hub near Memphis, Tennessee. DLA and GSA recognize the high quality and value of the FedEx operation and have modified business practices to incorporate their services.

Resulting from the National Performance Review, DLA took action to establish a reinvention lab to look at the possibility of outsourcing receiving, warehousing, and shipping to third party logistics providers. The culmination of this initiative was the creation of the “Premium Service” facility whereby DLA partnered with FedEx in Memphis to provide these services to DoD customers.¹ Currently, this facility is managing over 5,000 specific national stock numbers (NSNs) for the DoD in a 120,000 square foot facility adjacent to the FedEx hub.² DLA lauds the program as the “fastest, most reliable and customer-oriented distribution channel in the Department of Defense, offering time-definite transportation service for critical, mission essential items.”³ One of

the major benefits of the program is the ability for a customer to place an order as late as midnight and have the asset delivered to their door in the CONUS by 10:30 a.m. the next morning. According to DLA, “for West Coast customers, the additional times to place orders for parts or equipment is like having an additional day’s worth of inventory.”⁴ As of June 1998, Premium Service had supported over 120,000 requisitions with an inventory accuracy rate reported at 99.99 percent and on-time delivery rate of 99.2 percent, creating tremendous customer confidence in FedEx’s process and reducing loss.⁵ These results translate into satisfied customers and a potential for further inventory reductions and savings. As a Premium Service customer, a Naval Inventory Control Point study concluded the CONUS O&ST over a three month sampling period averaged a mere 17 hours with worldwide 98.48 percent on-time delivery.⁶

The customer order process does not change when using Premium Service. For Air Force weapon systems inventory, the retail customer places a Military Standard Transportation and Issue Procedures (MILSTRIP) requisition into the Standard Base Supply System. This requisition passes to the wholesale system for IM determination of asset availability and release. The determination can be automated or manual depending on the criticality and worldwide availability of shortage of an asset. Once the IM has released an asset for shipment in the wholesale system, the release is passed electronically to the Premium Service Facility. For requisitions with automated releases, a requisition entering the wholesale system during DLA distribution depot and IM non-duty hours would potentially be en route or delivered before it normally would have been received for order filling under the current whole distribution system. This once again

equates to potential inventory savings when factoring O&ST in the IM computation model.

Resulting from logistics lessons learned in Operations DESERT SHIELD and DESERT STORM, the DoD mandated the Services and DoD Agencies improve in-transit visibility of assets. A customer should have accessibility to determine at any given point after a requisition is generated, the status of their requisition in the supply pipeline. Premium Service, through the Defense Automatic Addressing System Center, provides a daily status to the Air Force Advance Tracking and Control and the Global Transportation Network.⁷ In addition, and as with any FedEx shipment, if the customer knows the FedEx tracking number, in-transit visibility can be achieved through the use of the FedEx worldwide web tracking site by calling a toll free number in the CONUS.

Another potential benefit Premium Service affords is the ability to determine when stockage is low and request replenishment. This is accomplished through coordination with the IMs at Service Inventory Control Points who set minimum reorder levels. Once the level is reached, the IMs is contacted as requested to replenish the stock.⁸ In an efficiently operating wholesale system, the IM should be able to predict an approximate replenishment requirement date and set procurement and depot maintenance lead times to backfill stock levels without Premium Service notification.

Inventory accuracy was mentioned earlier but it is important to note DLA's Premium Service contract with FedEx requires a minimum 99 percent inventory accuracy level. For an additional charge, customers can request FedEx conduct wall-to-wall physical inventories as needed. With a documented actual 99.99 percent inventory accuracy rate, this added expense appears unnecessary to add to the overall retail price of the asset.

Customs clearance has in the past been a problem for overseas customers using commercial express carriers. Working closely with the Air Force, FedEx has solved most of these issues into and out of most countries. With the advent of a United States Transportation Command and Air Mobility Command initiative called Worldwide Express (WWX), customs issues are clearly primarily the carrier's responsibility. WWX is a DoD mandatory use contract for packages moving to, from, or between overseas locations. Shipments moving under this contract have maximum weight and size limitations to be considered eligible. Though certainly not the only carrier awarded under this multi-year contract, FedEx was awarded the lion's share. FedEx is the only commercial express carrier awarded all four designated regions of the world: European Theater, Pacific Theater, Central Theater, and Southern Theater. In fact, FedEx is the only WWX contract carrier into South America.⁹ FedEx's overwhelming participation in WWX and success in solving most customs issues enhances the concept of placing Air Force assets in the Premium Service facility.

As alluded to earlier, GSA solicited and awarded a CONUS small package contract to FedEx. This is also a mandatory use contract for all DoD shippers to utilize for shipments weighing under 150 pounds, originating in the CONUS, meeting specific maximum size limits, and with consignors in the CONUS, Alaska, Hawaii, and Puerto Rico. The Navy's experience with a 17-hour average CONUS delivery performance from the Premium Service facility also lends credibility to increased Air Force usage.

Premium Service funding differs from typical DLA Distribution Depot funding and will be addressed next.

Notes

¹ Gookin, William, "Premium Service Facility," *Loglines* 3, no. 4 (June 1998):19-20.

² Ibid.

³ Information Sheet. DLA Premium Service, undated.

⁴ Gookin.

⁵ Ibid.

⁶ Briefing by the Naval Inventory Control Point, subject: Premium Service, undated.

⁷ Information Sheet. DLA Premium Service, undated.

⁸ Ibid.

⁹ Worldwide Express Home Page, available from
<http://public.scott.af.mil/hqamc/wwx>

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Chapter 4

Premium Service Funding

In order for DLA to provide Premium Service to the DoD, there must be associated charge. Similar to line charges addressed above, each time an asset is receipted or shipped, DLA charges the customer. There is however a significant difference in the construct of the line charge for off-base issues or shipments. Similar to the DLA Distribution Depots, Premium Service charges a set price when receipting an asset. When a requisition flows into Premium Service and shipped, DLA assesses a handling charge based on the size of the item (bin or medium bulk). Differing from the line charges assessed at the distribution depots, the Premium Service handling charge does not include transportation costs. In addition to this handling charge, actual transportation charges are assessed based on the destination and utilize the applicable GSA or WWX contract rates and aggregated to the Service customer.

For the actual funds transfer to occur, Military Interdepartmental Purchase Requests (MIPR) are generated by the Services validating maximum funds availability for Premium Service and provided to DLA. DLA in-turn will determine and assess charges against the MIPR.

Since DLA has negotiated a long-term contract with FedEx, the line charges are not as vulnerable to rate swings as those at the DLA distribution depots. For instance, the

Comptroller in the Office of the Secretary of Defense (OSD (C)) determines annually in the Program Budget Decision cycle rates DLA will assess for services rendered.¹ These rates are fed to OSD (C) by DLA based on previous year and projected “profits” and/or “losses”. OSD (C) adjusts or approves these rates and the Services must then assimilate them with OSD (C) determined increases in obligation authority. The end result is typically a price increase passed through to the Service customer and a potential reduction in available O&M funds for other uses. Premium Service provides stability to the process through long-term fixed rate contracts with FedEx coupled with long-term fixed rate contracts negotiated by in the GSA and WWX contracts. To fully explore the Premium Service option, eligible types of inventory should be addressed.

Notes

¹ Department of Defense. *Program Budget Decision, Cost of Operations and Customer Prices for the Defense Working Capital Funds*. no. 426. (Washington, D.C.: Office of the Under Secretary of Defense [Comptroller], 19 December 1997), 128-9.

Chapter 5

Inventory Considerations

When considering the use of the Premium Service facility, types of inventory must be explored. The Premium Service Program Manager does not recommend the Services place all of their assets into the facility, but consider value, demand data, criticality, availability, and maturation in selection.¹ The following will examine potential candidates for Premium Service placement.

In the weapon systems acquisition process, manufacturers may develop military weapon systems unique tooling and processes in order to produce a secondary item (spare). Once the production line is terminated, the cost to reactivate the line is cost prohibitive and the production lead-time is too long for acceptable weapon systems support. To ensure long-term weapons systems support, the acquisition community will opt to procure a certain amount of these assets as “insurance items”. This means there will be little demand due to low anticipated failure rates but unforeseeable circumstances might arise whereby one day the asset becomes critical to weapon systems support. There is no additional cost to the Air Force to warehouse these assets beyond the initial DLA receipt line charge. Utilizing Premium Service could reduce the initial provision requirements and saving procurement dollars by eliminating the need for OCONUS inventory placement and centrally warehousing these insurance items.

Other potential candidates include very expensive spares regardless of demand history. For instance, by centrally locating avionics components, IMs could reduce wholesale inventory levels and by placing at the impact the safety level computation at retail site by reducing average O&ST. Premium Service's ability to provide the component to the customer in 17 hours in the CONUS and 48 hour delivery OCONUS should potentially reduce safety stock levels and obligation authority requirements in retail accounts. While some safety stock would still be required, with rapid, time-definite resupply, on-hand retail stock reduction should also have collateral impact such as decreased workload for inventory sections of retail base supply accounts. In some cases, IMs cannot afford to stock adequate levels of components due to the high asset cost endangering the operational availability of the end item. By leveraging Premium Service, the computation model should reduce the requirement and improved the actual weapon systems support.²

Additional possibilities may include initial spares (budget code 15) for new weapon systems fielding. Under the current acquisition process, spares for new weapon systems are computed on anticipated mean time between failure, weapon systems use profile, and condemnation rates. Secondary asset purchase is calculated and execution on engineering projections vice actual rates. This procedure can drive incorrect procurement decisions resulting in over or under-buying spares requirements. For example, as a result of excellent engineering by the manufacturer, the C-17 Globemaster III experienced lower than projected brake failures in the first few years of weapon system life. From this, one could extrapolate there were fewer than anticipated condemnations with excess assets purchased. If the initial provisioners had any doubts of the validity of the

engineering estimates concerning mean time between failure, they could have utilized a time-definite resupply facility such as premium service to offset a reduced buy. Once the actual failure and condemnation rates were established, the IMs could reassess buy requirements potentially saving dollars throughout the weapon system's life cycle. Conversely, if a higher than anticipated usage of a secondary component at the beginning of a weapon systems life demanded a shorter pipeline due to an underestimated buy requirements, Premium Service could offset the risk. A prime example of this scenario concerns the oil pan on the Pratt and Whitney 2000 series engine supporting the C-17. An engineering design flaw on a supporting strut caused premature cracks at the welded points and ultimate failure. This occurred at a crucial time during the beginning stages of the C-17 airlift into Bosnia. With an extreme shortage of these oil pans, any reduction in the O&ST could have offset the potential reduced aircraft availability rates until additional pans could be procured.

The DLA Premium Service Program Manager also suggests viable candidates should include materiel purchased on a sole source basis or materiel that has a procurement lead-time where intensive distribution control would simplify procurement decisions.³ Design unstable and configuration specific assets under strict engineering control might also benefit from the distribution service of the DLA/FedEx facility. By having quick access to provide a secondary item to an original manufacturer to reconfigure/modify for a design change, placement in Premium Service could enhance asset availability and weapon systems support. Commercial-off-the-shelf, nonstandard hardware and software that must be closely controlled for end item technical suitability and should also be considered by logisticians for location at Premium Service.

With the advent of an Expeditionary Aerospace Force concept, planners should give consideration to placing contingency stocks at this facility. The Air Force already configures Mobility Readiness Spares Packages by weapons systems requirements at the retail level for quick deployment in the case of a contingency. Placement of this stock at Premium Service would however reduce the convenience of the retail customer “borrowing” from these contingency kits when spares shortages exists in the non-contingency retail accounts. It is critical to note that in order for contingency stocks to be effectively distributed into combat zone, the Air Force must have a functional Air Mobility Express and battlefield distribution operation in-place. This will be addressed further in a subsequent chapter.

Finally, a potential high payoff opportunity exists to place high cost, periodically required test and support equipment at this location for quick, worldwide placement. Instead of each base or Major Command procuring this equipment just in case or for periodic use, central warehousing creates a potential savings for the Air Force with little to no mission impact. There might also be an option to centrally fund procurement of these types of assets to enhance fiscal efficiency. Premium Service offers an additional benefit to the customer at no cost that might be beneficial to the Air Force with shared test equipment. By FedEx including a pre-printed return airway bill, the customer (e.g. Precision Measurement Equipment Laboratories, Aircraft Maintenance) can quickly return the asset to the storage warehouse without transiting the base supply or transportation functions. This would require central asset management similar to the current engine management process to ensure asset priority and accountability and may offset the fiscal benefits of such a program. While this program may have operational

impact through enhanced asset availability or accessibility, a cost comparison must be conducted in order to determine economic feasibility.

Notes

¹ William Gookin, Headquarters Defense Logistics Agency Support Command, Premium Service Program Manager, interviewed by author 5 February 1999.

² Ibid.

³ Ibid.

Chapter 6

Cost Comparison

Placing wholesale assets at the Premium Service facility will certainly increase the transportation legs of the SMAG price but may be more than offset by inventory reductions. The following will provide a simple cost comparison of selected secondary components for CONUS customers using the GSA Small Package Contract pricing.¹

This paper previously outlined the wholesale and retail distribution process as they pertain to transportation. At the wholesale level, line charges are assessed upon asset receipt/storage or on/off-base issue. Assuming an Air Force preferred on-demand repair process vice batch processing, a single asset would be assessed four line charges during a typical depot maintenance cycle: 1) upon asset receipt from the retail account, 2) upon issue to the depot maintenance activity, 3) upon asset repair and re-warehousing, 4) and finally upon asset shipment to an off-base customer. Ultimately, the Air Force is working toward a process whereby the item proceeds directly to the repair facility upon receipt from the retail account. This would eliminate one of the line charges but is not currently in-place Air Force depot maintenance activity-wide.

Table 1. Rate Comparisons²

DLA Distribution Depot and Premium Service Rate Comparison

	Premium Service FY99 Rates	DLA Distribution Depot FY99 Rates
Receipt		
Bin	\$19.56	\$28.72
Medium Bulk	\$19.56	\$40.11
Heavy Bulk/Hazardous	\$19.56	\$53.85
Issue		
Bin	\$10.61	\$16.07
Medium Bulk	\$10.61	\$32.64
Heavy Bulk/Hazardous	\$10.61	\$63.16
Transportation (Off Base)		
Bin	Actual Cost	\$ 0.89
Medium Bulk	Actual Cost	\$10.52
Heavy Bulk/Hazardous	Actual Cost	\$18.55

Using fiscal year 1999 rates as outlined in Table 1, the typical 107 pound secondary asset (from a pool identified later in this chapter) charged by a DLA Distribution Depot based on fiscal year 1999 rate would be as follows:

Medium bulk receipt	\$40.11
Medium bulk on- base issue	\$32.64
Medium bulk receipt	\$40.11
Medium bulk off-base issue	\$43.16
Total	\$156.02

Without changes in Air Force depot repair processes such as receipting directly for the item in the repair shop thereby bypassing the DLA Distribution Depot, this cost will fluctuate only with rate adjustments. Adding the Premium Service option in the distribution process effectively creates additional warehousing and transportation bills. Using Table 1, the increased cost to the SMAG and subsequent O&M accounts for Premium Service on a typical 107-pound box would be:

Receipt	\$19.56
Issue	\$10.61
<u>Actual Trans Charges³</u>	<u>\$ 72.25</u>
<i>Sub-total</i>	\$102.42
Total (Incl DLA Depot)	\$258.44

Adding Premium Service to the distribution process represents a 66 percent increase when warehousing and shipping a 107 pound secondary item in the CONUS. A similar computation for a medium-sized, 10 pound item results in an increased warehousing and transportation cost of 42 percent while a 150 pound item increases in cost by 53 percent. For shipments consigned OCONUS, a corresponding rate increase appears probable. In order for the Premium Service to be fiscally responsible, inventory reductions would need to occur.

According to DLA, the Premium Service facility performance and value is best when focusing on packages weighing 150 pounds or less.⁴ In addition, dimensional requirements must also be met. The maximum package dimensions for Premium Service are: 165 inches total length and girth combined with no single side exceeding 119 inches.⁵ Using data gleaned from the Reparable Pipeline Data Analysis Tool (RIPDAT) and Recoverable Consumption Item Requirements System (D041) wholesale system by the Logistics Management Institute, there are 2,700 stock numbered spares (budget code 8 or 15) managed by the Air Force with active demand data that meet the packed weight requirement of 150 pounds or less.⁶ Of these NSNs, only 2,000 meet the Premium Service dimensional requirements totaling 461,500 individual units. This determination was made using possibly outdated wholesale weight and dimensional data and may require revalidation according to the Logistics Management Institute.

Based on the latest acquisition cost, the total value of the eligible inventory is 451.5 million dollars with an average cost per unit of 972 dollars, a surprisingly relatively low cost per unit.

Further research shows a mere 14.7 percent of the NSNs in the eligible pool accounts for 38.4 percent of total inventory value. Furthermore this 14.7 percent of NSNs (297) equates to only 2 percent (9,400) of total line items in the inventory. These assets represent an arbitrary minimum 5,000 dollar break point using latest acquisition cost and resulted in the high valued item at 262,000 dollars.⁷ This pool appears to have the highest potential for considering placement in the Premium Service facility (see Appendix A).

Using these 297 NSNs or 9,400 line items, the computation estimates total inventory value at 168 million dollars. With an 8.47 day average Air Force Logistics Response Time, each day O&ST for this inventory equals 19.8 million dollars. Comparing the typical DLA Distribution Depot process to the average Premium Service O&ST (17 hours) substantiates at least a one-day benefit in O&ST reduction. The actual number of wholesale demands from April 1997 through Mar 1998 for these high-value, secondary items was 1,927. Using this as a multiplier of the delta between Premium Service and the standard DLA Distribution Depot rate equates to a 197,363 dollar annual increase in transportation costs (1,927 X \$102.42).

In the logistics community, the Air Force typically sets a five to one return on investment for inventory to transportation ratio. Using this pool of inventory and with a one-day improvement in O&ST results in an 100 to 1 ratio of potential annual inventory cost avoidance to transportation cost increases, clearly an effort to pursue.

Retail stocks present a more difficult comparison. A correlation can be drawn however between wholesale stock O&ST and retail stock O&ST when determining safety levels. Additional study is required to determine potential retail savings and is beyond the capabilities of this author. Centrally warehousing high-value (fiscal and functional) assets has potential drawbacks.

Notes

¹ *FedEx U.S. Government Contract Service Guide* (Memphis, TN, 1997), 12.

² Draft Technical Report, "Collocating Inventory With Commercial Express Transportation Hub," (Dynamics Research Corporation, 31 January 1999).

³ Ibid.

⁴ Gookin, interview.

⁵ Draft Technical Report, "Collocating Inventory With Commercial Express Transportation Hub," (Dynamics Research Corporation, 31 January 1999).

⁶ Robert Burleson, Logistics Management Institute, Excel Spreadsheet with custom data requested by the author, December 1999.

⁷ Ibid.

Chapter 7

Potential Drawbacks to Premium Service

If the Air Force chooses to use Premium Service for weapon systems spares, centrally locating them may present a center of gravity or target to its enemy for exploitation. Particular care should be taken to ensure a sufficient quantity of each type of asset is held in reserve at the Air Logistics Centers to offset this threat.

In addition, placing all assets with a single commercial express carrier may create an unacceptable vulnerability. FedEx and United Parcel Service have experienced problems with labor union strikes or the last several years. The Air Force, in cooperation with the affected carriers, worked diligently to ensure the strikes had minimal impact on its shipments. However, placing all stock on the shelves at a FedEx facility might present unacceptable risk to strikes and should be carefully considered.

Inventory reduction has inherent risks, which must be explored. In an Air Force Journal of Logistics article, Virginia A. Mattern of the Logistics Management Institute made the case where inventory reduction based on anticipated demand levels could have a disastrous impact on the Air Force in wartime.¹ A study for DLA by the Logistics Management Institute “found that parts with historically low demands can suddenly experience high demands.”² This could result in an exacerbated effect if inventory reductions are taken based solely on O&ST reduction. She states “buying minimal stock

can lead to unexpected stock depletion that could adversely affect mission capability.” This could be a notable problem in wartime.

An additional potential drawback would occur if IMs change the status of an asset from automated release in the wholesale requisition process to one required IM review prior to release. This flag would add O&ST and negate any fiscal or weapon systems support benefit from an O&ST perspective.

Finally, as mentioned earlier, it is crucial for the Air Mobility Express and battlefield distribution to be operational and effective in wartime. Placing contingency stocks at the Premium Service facility has little benefit if the stocks can only be moved to an airhead quickly and in a time-definite manner without the capability to make the final leg of the journey to the warfighter.

Notes

¹ Mattern, Virginia A., “Inventory Reduction: When Is Enough Enough?” *Air Force Journal of Logistics* 21, no. 2 (Spring 1997): 8-12.

² Ibid.

Chapter 8

Conclusion

DLA's Premium Service facility provides an additional "arrow in the quiver" of the Air Force logistician. FedEx, in partnership with DLA, has streamlined the warehousing process as evidenced by their ability to receive a requisition, process, ship, and deliver to the CONUS customer within 17 hours. Considering the increased transportation cost, not all types of inventory are logical for placement at this facility, but some certainly make sense. Appendix A provides a starting point for placement of Air Force in the Premium Service facility. Based on potential inventory savings and enhanced warfighter support, the most logical assets to place there are about three hundred high-value (over 5,000 dollars), high payback secondary weapon systems assets. Additional research should be conducted on the potential of centrally warehousing retail stocks as well.

This report should add support to a Dynamics Research Corporation parallel study that should provide an unbiased, definitive recommendation to the Air Force on Premium Service use. In the author's opinion and based on the above research, the Air Force should take immediate action to collocate some weapon systems inventory with the DLA Premium Service facility in Memphis, Tennessee.

Appendix A

Candidates for Premium Service¹

ALC = Managing Air Logistics Center

NSN = National Stock Number

UISSUE = Unit of Issue

BOST = Average Base Order and Ship Time

ALC	NSN	ITEM	PRICE	UISSUE	BOST
WR	1270012446118FX	PANEL ASSY	6180.00	EA	5
WR	1610010199878	VLV&FLANGE	5800.00	EA	4
OC	1650007302850	VALVE	6746.00	EA	5
OO	1650011484284LE	SERVOVALVE	5170.00	EA	9
SA	1680001323280	ACTUATOR	6803.00	EA	11
SA	3010012115414	CLUTCHASSY	20750.00	EA	10
WR	4810001386680BZ	VALVE	5430.00	EA	9
OC	4810003960791HS	VALVE	2934.00	EA	0
SA	4810005370335	DIRCONTVLV	8100.00	EA	8
SA	4820014328465LD	VALVE,CHEC	7134.00	EA	9
SA	4920010821110LH	VIB AMPL	6895.18	EA	9
WR	5821010934574	VSH HUD	8065.21	EA	18
WR	5821010934575	VSH VSD	8587.23	EA	9
WR	5821012316118	VID SENS H	11002.00	EA	6
WR	5821012483022FX	SENSOR ASS	22616.00	EA	5
WR	5826010485194	CNTR 71BC0	18148.43	EA	6
SM	5835013513425SN	HEAD ASSY	15838.27	EA	9
WR	5841012785895CX	CIR CD	12404.00	EA	6
WR	5865004829281EW	REG AY Q99	8520.00	EA	2
WR	5865004831734EW	REG AY Q99	6030.00	EA	9
WR	5865010321234EW	DETECTOR	5150.00	EA	9
WR	5865010564828EW	COUP ALR69	5753.00	EA	9
WR	5865010843619EW	OSC ALQ99	5450.26	EA	9
WR	5865011745742EW	COMMODU	46913.78	EA	8
WR	5865011759513EW	DLDRIVR	19264.65	EA	9
WR	5865011759724EW	REPEATERDR	25806.39	EA	9
WR	5865011761236EW	GAINCTL	10940.00	EA	9
WR	5865012211089EW	SIGNALPROC	7946.00	EA	6
WR	5865012240710EW	RECEIVR	51706.54	EA	9

WR	5865012240711EW	RECEIVER	51990.11	EA	3
WR	5865012551329EW	DETECTOR	27661.00	EA	9
WR	5865012678661EW	OSCILLATOR	24395.85	EA	9
WR	5865012681998EW	OSC DU	38496.55	EA	9
WR	5865012682000EW	OSC DUALDI	38666.92	EA	11
WR	5865012682001EW	OSC DUALDI	40351.82	EA	20
WR	5865012682002EW	OSCILLATOR	38777.60	EA	9
WR	5865013199515EW	REM DF CTL	6085.00	EA	9
WR	5865013358345EW	CONTRL IF	63855.75	EA	9
WR	5865013358346EW	CONTRL IF	63855.75	EA	9
SM	5895004597964ZR	CIRC CD AY	13738.37	EA	5
WR	5895010338279EW	DETECTOR	6287.33	EA	9
WR	5895010351139EW	SA135AMP 2	5250.00	EA	14
WR	5895010546061EW	SWTCHALR62	5467.92	EA	9
OO	5895010601990TA	MODULE	7420.00	EA	9
WR	5895011745741EW	CONTROL	47328.19	EA	9
WR	5895011754231EW	AMP ASY	46996.44	EA	9
WR	5895011759512EW	DETASSY	33813.52	EA	4
WR	5895011759723EW	AMPCET	59720.24	EA	9
WR	5895011761161EW	LIM SW	33803.74	EA	9
WR	5895011774375EW	COMM DU	40933.66	EA	9
WR	5895011832051EW	CONTRL	57768.24	EA	9
WR	5895011873233EW	MIXER AMP	5166.54	EA	9
WR	5895011932821EW	LIMITAD	6558.00	EA	9
WR	5895012184258EW	SWTCHAY	49189.29	EA	9
WR	5895012213942EW	DOUBLER/MI	11886.00	EA	9
WR	5895012242725EW	DUAL ID	57987.20	EA	14
WR	5895012247832EW	COMBINR	43487.95	EA	9
WR	5895012261144EW	COM AY	44511.75	EA	9
WR	5895012340858SO	IL CONTROL	12762.13	EA	9
WR	5895012417626EW	DBLR/MXR	10386.50	EA	3
WR	5895012556868EW	RF LOG DET	8337.22	EA	5
WR	5895012663351EW	DETECTR	23543.05	EA	9
WR	5895013076426EW	DISCRIMINA	9030.00	EA	6
WR	5895013077347EW	PRESELECTO	8695.00	EA	4
WR	5895013380629EW	CONTRL IF	63855.75	EA	4
WR	5895013588153SO	INTGRD PNL	6337.00	EA	9
SA	5895013828643LD	KEYBOARD	6617.40	EA	9
WR	5895013955327SO	SYNCHRO,EL	21053.00	EA	9
WR	5895013962183EW	CCA	8350.00	EA	9
WR	5915011743144EW	FILTER RF	46578.09	EA	9
WR	5915011743145EW	FILTER RF	42235.48	EA	9
WR	5915011759451EW	FILTER	42163.55	EA	14
WR	5915011951904EW	FILTER BP	44157.44	EA	9
WR	5915011966016EW	FLTRBAN	53387.77	EA	9
WR	5915012121044EW	DGTLPHSFT	5396.00	EA	9

WR	5955004113445	OSC APQ122	14853.40	EA	9
WR	5955011724865EW	OSCILL/CTL	52499.08	EA	9
WR	5955011724866EW	OSCILLATOR	34540.02	EA	9
WR	5955011724867EW	CCA	43274.77	EA	9
WR	5955011724868EW	OSCDGT TUN	24711.91	EA	5
WR	5955011744853EW	OSCILLATOR	32169.58	EA	9
WR	5955011744857EW	OSC RES	34931.28	EA	9
WR	5955012124104EW	OSCILLATR	5652.00	EA	3
WR	5955012278670EW	B5 VCO	12800.00	EA	9
WR	5955012777782EW	OSCILLATOR	9950.00	EA	7
WR	5955013021263EW	OSC NONCRY	29278.75	EA	9
WR	5955013084513EW	AMPLIFIER	6159.00	EA	5
WR	5955013297925EW	CCA	36862.82	EA	9
WR	5960010661292EW	TWT ALQ137	9418.25	EA	5
WR	5985010843620EW	MICRWAYQ99	6521.53	EA	11
WR	5985011733027EW	SWITCH, RF	25012.34	EA	9
WR	5985011733040EW	MODULE	19759.32	EA	9
WR	5985011744773EW	SWITCH RPT	33386.15	EA	9
WR	5985011744781EW	VVA MODU	26110.59	EA	9
SM	5985011783834ZX	PWR CMBINR	7650.00	EA	9
SM	5985011982224	MIXER	10275.78	EA	9
WR	5985012137727EW	SWITHRF	6142.00	EA	9
WR	5985012355175EW	SWITCH RF	10229.00	EA	9
WR	5985012658416EW	VARIABLE A	22086.77	EA	3
WR	5985012684574EW	SWITASY	67598.90	EA	9
WR	5985012688430EW	SWITCH RF	24866.52	EA	9
WR	5985012689600EW	VVA MODULE	16023.07	EA	8
WR	5985012995990EW	SWITCH A	9200.00	EA	9
WR	5995013099966EW	CABLE ASSY	8073.00	EA	9
WR	5996004775921EW	AMP R56-3	6495.00	EA	9
WR	5996010489979EW	AMP M62	8030.21	EA	6
WR	5996011729392EW	AMP RF OSC	28483.23	EA	4
WR	5996011730597EW	AMPLF RF	32244.29	EA	9
WR	5996011730598EW	AMPLF RF	53074.86	EA	9
WR	5996011730599EW	AMPLIFR	62499.92	EA	9
WR	5996011730600EW	AMPLFR, RF	31935.47	EA	9
WR	5996011730601EW	AMPLFR, RF	40013.35	EA	3
WR	5996011744849EW	AMPLIFR, R	48025.54	EA	4
WR	5996011745744EW	AMPLRRF	40213.06	EA	9
WR	5996012124102EW	AMPLIFR	7683.00	EA	2
WR	5996012129078EW	AMPLIFR	5552.00	EA	7
WR	5996012164830EW	LOGIFAM	24717.47	EA	9
WR	5996012166065EW	LOGIFAM	20301.94	EA	12
WR	5996012166066EW	LOG FAM	24717.47	EA	3
WR	5996012177512EW	PREAMPFLTR	34097.47	EA	6
SM	5996012184246ZW	AMP	8036.00	EA	7

WR	5996012191187EW	LOGAMP	28619.45	EA	9
WR	5996012308671EW	AMP ASSY	5419.14	EA	9
WR	5996012327395EW	RF AMPLIF	8797.23	EA	9
WR	5996012460078EW	SSA	6168.00	EA	3
WR	5996012524105EW	AMPLIRF	41154.64	EA	9
WR	5996012662280EW	AMPL	6548.00	EA	9
WR	5996012662281EW	AMP RF	45060.47	EA	9
WR	5996012678739EW	AMPLF RF	34297.75	EA	9
WR	5996012684645EW	SECTOR ASY	37636.31	EA	9
WR	5996012684646EW	GAIN CTRLA	33931.46	EA	9
WR	5996012684647EW	ATTENUATOR	45870.10	EA	7
WR	5996012688577EW	SECTOR SUM	28429.39	EA	9
WR	5996012694143EW	AMPLIF.RF	31891.62	EA	9
WR	5996012765370EW	COUPLER,AM	6821.87	EA	5
WR	5996012874143EW	LOG VIDEO	5050.54	EA	4
WR	5996012918144EW	LOG VIDEOA	7133.00	EA	5
WR	5996012920769EW	LOG VDAMPL	5017.00	EA	5
WR	5996013111167EW	AMPLF RF	40960.42	EA	9
SA	5998002024827LH	CIR CD ASY	5046.30	EA	8
WR	5998002843247FX	CKT CARD	10383.78	EA	9
SA	5998005507626DQ	CKT CD ASY	6952.23	EA	9
OO	5998006013433AH	CIRCUIT CD	6310.06	EA	9
WR	5998010109270AY	A3CKT CARD	6765.94	EA	5
SM	5998010146332	CIR CD ASY	5790.00	EA	9
SM	5998010157623ZR	CIRCUIT CD	7260.00	EA	9
WR	5998010158936CW	CCA APN213	9332.00	EA	9
WR	5998010158937CW	CCA APN213	6479.00	EA	9
SM	5998010513043ZU	CIR CD ASY	5070.00	EA	17
WR	5998010514156SO	GENERATOR	7380.43	EA	9
SM	5998010521401ZU	FREQ SYNTH	5463.00	EA	10
SM	5998010606621	CKT CARD	7514.00	EA	9
SA	5998010682940DQ	CKT CD ASB	5554.24	EA	17
SM	5998010692952JD	CIR CD ASY	8019.63	EA	9
OO	5998010720096WF	PROG SEQ	5074.28	EA	9
WR	5998010732347FX	CARD,OSCIL	8388.85	EA	5
WR	5998011056993EW	REPLACED	5882.15	EA	9
OO	5998011069835WF	LOSS CCA	11484.00	EA	9
SM	5998011262494ZX	CKT CD ASY	5572.00	EA	9
WR	5998011263190EW	VCO G-H BD	10691.28	EA	9
OC	5998011601701EK	CIR CD ASY	7559.75	EA	9
WR	5998011636913EW	CCA ALQ137	9477.00	EA	3
OO	5998011730672WF	EFCC A/D C	6856.00	EA	10
OO	5998011730673WF	EFCC DBI	5207.00	EA	9
OO	5998011730674WF	EFCC DBC	8804.00	EA	9
OO	5998011730677WF	EFCC #3PRO	6645.00	EA	9
OO	5998011730679WF	EFCC #1PRO	6534.00	EA	9

OO	5998011730682WF	EFCC MEI	6760.00	EA	9
WR	5998011731933AY	CKT CRD AY	7550.20	EA	6
WR	5998011754107EW	CCA	16173.67	EA	3
WR	5998011754154EW	CCA DMA	17517.16	EA	19
WR	5998011759641EW	DLDRIVR	32935.20	EA	9
WR	5998011759677EW	CCA COA	36453.88	EA	9
WR	5998011759690EW	GEN MDL	7069.20	EA	2
WR	5998011834320EW	LIN MOD	10768.29	EA	18
WR	5998011882101EW	RF MODULE	14215.38	EA	7
WR	5998011892712JZ	ELEC COMP	5640.00	EA	9
OO	5998012029759WF	POWER CONV	12838.00	EA	10
WR	5998012112305EW	HELIXDR	14201.00	EA	3
WR	5998012178004EW	CCA	43674.54	EA	9
WR	5998012178005EW	CODR CCA	28558.00	EA	4
WR	5998012178007EW	ENCD CCA	22730.20	EA	4
WR	5998012178008EW	ENCD CCA	28187.34	EA	5
WR	5998012178012EW	PRMTCCA	34481.00	EA	7
WR	5998012178013EW	AMP CCA	27096.00	EA	9
WR	5998012178015EW	D CCA	29549.29	EA	9
OC	5998012198299NT	FISC A1	18780.78	EA	9
OO	5998012221936WF	XFCC MLD	7351.00	EA	9
OO	5998012223849WF	XFCC #1CPU	5885.00	EA	9
WR	5998012229567EW	WIDLIMIT	43617.50	EA	13
WR	5998012258207EW	SIG CONDIT	8664.00	EA	9
OO	5998012283893WF	EFCC MIF	7500.00	EA	25
WR	5998012313592EW	CCA CHAN	17325.56	EA	9
WR	5998012313593EW	CCA CHAN	21088.48	EA	9
WR	5998012359431SO	CKT CD XBD	7070.19	EA	9
WR	5998012363788SO	CC, QUAD	6715.18	EA	9
WR	5998012363790SO	CC,COMP CT	5114.13	EA	9
WR	5998012368590FX	CCA	7292.20	EA	9
WR	5998012368592FX	CKT CARD	5980.63	EA	9
OO	5998012437973WF	EFCC I/O C	6106.00	EA	9
WR	5998012528292EW	TRANSMIT	6460.00	EA	9
WR	5998012621999EW	CCA	21381.37	EA	4
WR	5998012626433EW	MEMORY CTR	6581.00	EA	10
WR	5998012626434EW	DRFM CT	15182.50	EA	9
WR	5998012626435EW	MEMORY CTL	5477.44	EA	4
WR	5998012626440EW	GENERATOR	5020.00	EA	9
WR	5998012626441EW	CONTRL BD	11439.18	EA	3
WR	5998012626442EW	NOISE GEN	5706.20	EA	5
WR	5998012627157EW	I/OCONM	5150.08	EA	2
WR	5998012628373EW	CCA	18168.00	EA	9
WR	5998012632482EW	CCA	16284.41	EA	9
WR	5998012632495EW	CCA	5005.00	EA	9
WR	5998012632496EW	CCA	5578.00	EA	4

WR	5998012642305AY	ELEC COMP	6712.00	EA	13
WR	5998012663529SO	JUX CONTRL	18042.00	EA	9
WR	5998012684689EW	CCA	18748.00	EA	12
WR	5998012696978EW	CCA	6068.20	EA	6
WR	5998012707760EW	CCA/VVA	35572.18	EA	9
WR	5998012818680AO	CCA	6486.24	EA	9
WR	5998012919964SO	CCA	6504.00	EA	9
WR	5998012956012EW	CKT CD ASY	6435.00	EA	9
SA	5998012957874DQ	CCA1553BUS	6239.00	EA	9
OO	5998013085522WF	GAC S/DIMA	14474.00	EA	9
WR	5998013091230AY	ECA,PBX	19322.00	EA	9
WR	5998013091237AY	CCA,MBM	20683.00	EA	9
WR	5998013106326AY	CCA,PBX	15039.00	EA	8
WR	5998013120793EW	POWER CONT	10259.00	EA	8
WR	5998013204240EW	CCA	5647.00	EA	9
WR	5998013314963EW	LOG AD/NSD	5199.00	EA	9
SM	5998013321207ZR	CKT CD ASY	7477.87	EA	9
WR	5998013541304EW	CCA	6510.00	EA	6
WR	5998013585160AY	CCA,NOSE	10212.63	EA	9
WR	5998013590045SO	CCA	5309.00	EA	9
WR	5998013592711SO	CCA	7300.00	EA	9
OC	5998013619954NT	CIR CD ASY	14521.47	EA	4
SA	5998013663104LD	CIRCUIT CD	7734.00	EA	9
SA	5998013664338LD	CIRCUIT CD	5047.70	EA	9
WR	5998013715420SO	I/F CCA	5974.00	EA	9
WR	5998013750411EA	CCA	6768.00	EA	9
WR	5998013750412EA	CCA	6968.00	EA	9
WR	5998013782907EA	CCA (A3)	9381.00	EA	9
WR	5998013800651BY	CCA	6905.62	EA	9
SA	5998013861178LD	CRKT CD AY	18210.70	EA	9
WR	5998013871915AY	ECA,RISLEY	8606.96	EA	9
WR	5998013883018AY	ELEC COMP	8424.59	EA	12
SA	5998013961557LD	CIRCUIT CA	2600.00	EA	9
SA	5998013975858LD	CIRCUIT CA	5798.02	EA	9
SA	5998013987380LD	CIRCUIT CA	15749.19	EA	9
SA	5998014110969LD	CKT CD ASY	30427.89	EA	9
SA	5998014110973LD	CKT CD ASY	31409.24	EA	9
SA	5998014298340LD	CIRCUIT CD	8406.18	EA	9
SA	5998014319256LD	CCA	35153.16	EA	3
SA	5998014329695LD	CCA	13614.54	EA	9
WR	5999011077976BZ	CARD ASSY	6080.00	EA	9
WR	6150013353061AY	CABLE ASSY	5170.00	EA	9

Notes

¹ Robert Burleson, Logistics Management Institute, Excel Spreadsheet with custom data requested by the author, December 1999.

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