The value of logistics information to the warfighter

Corrigan, Christopher J.; Kielar, Jayson E.

Monterey, California. Naval Postgraduate School

NAVAL POSTGRADUATE SCHOOL

MONTEREY, CALIFORNIA

MBA PROFESSIONAL REPORT

The Value of Logistics Information to the Warfighter

By: Christopher J. Corrigan
Jayson E. Kielar

June 2004

Advisors: Nicholas Dew
David R. Henderson

THIS PAGE INTENTIONALLY LEFT BLANK

REPORT DOCUMENTATION PAGE

Form Approved OMB No. 0704-0188

1. AGENCY USE ONLY ***(Leave blank)***	**2. REPORT DATE** June 2004	**3. REPORT TYPE AND DATES COVERED** MBA Professional Report

4. TITLE AND SUBTITLE:
The Value of Logistics Information to the Warfighter

5. FUNDING NUMBERS

6. AUTHOR(S) Christopher J. Corrigan, Jayson E. Kielar

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)

10. SPONSORING / MONITORING AGENCY REPORT NUMBER

11. SUPPLEMENTARY NOTES. The views expressed in this report are those of the author(s) 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 MBA project analyzes the benefit of integrating Radio Frequency Identification (RFID) technology into the Department of Defense supply chain management infrastructure. The project confirms the existence of an inherent value in logistics information used as a resource in Department of Defense supply chain management applications. Also identified is the value of comprehensive and real time logistics information to the warfighter and what he or she is willing to pay for that information. For example, the average value the warfighter is willing to pay on a deployed aircraft carrier is 2.46% of the carrier's average annual budget, or $856,775. To determine these values, the project uses the results of a survey distributed to Naval Supply Corps Officers who were used as survey respondents due to their positioning as a logistics and financial choke point between the man in the foxhole and their commanding officers. Using the value that Supply Officers are willing to pay for comprehensive and real time information, a value added figure is determined for the inclusion of RFID technology in the Department of Defense supply chain management infrastructure. Continuing with the aircraft carrier example, the value added figure is $11.28 per requisition.

14. SUBJECT TERMS Radio Frequency Identification Device (RFID) Technology, Supply Chain Management, Logistics, Supply, In Transit Visibility (ITV), Budget	**15. NUMBER OF PAGES** 109
	16. PRICE CODE

17. SECURITY CLASSIFICATION OF REPORT	**18. SECURITY CLASSIFICATION OF THIS PAGE**	**19. SECURITY CLASSIFICATION OF ABSTRACT**	**20. LIMITATION OF ABSTRACT**
Unclassified	Unclassified	Unclassified	UL

NSN 7540-01-280-5500

Standard Form 298 (Rev. 2-89)
Prescribed by ANSI Std. 239-18

THIS PAGE INTENTIONALLY LEFT BLANK

Approved for public release; distribution is unlimited.

THE VALUE OF LOGISTICS INFORMATION TO THE WARFIGHTER

Christopher J. Corrigan, Lieutenant Commander, Supply Corps, United States Navy
Jayson E. Kielar, Lieutenant, Supply Corps, United States Navy

Submitted in partial fulfillment of the requirements for the degree of

MASTER OF BUSINESS ADMINISTRATION

from the

NAVAL POSTGRADUATE SCHOOL
June 2004

Authors: Christopher J. Corrigan

Jayson E. Kielar

Approved by: Nicholas Dew, Lead Advisor

David R. Henderson, Support Advisor

Douglas A. Brook, Dean
Graduate School of Business and Public Policy

THIS PAGE INTENTIONALLY LEFT BLANK

THE VALUE OF LOGISTICS INFORMATION TO THE WARFIGHTER

ABSTRACT

This MBA project analyzes the benefit of integrating Radio Frequency Identification (RFID) technology into the Department of Defense supply chain management infrastructure. The project confirms the existence of an inherent value in logistics information used as a resource in Department of Defense supply chain management applications. Also identified is the value of comprehensive and real time logistics information to the warfighter and what he or she is willing to pay for that information. For example, the average value the warfighter is willing to pay on a deployed aircraft carrier is 2.46% of the carrier's average annual budget, or $856,775. To determine these values, the project uses the results of a survey distributed to Naval Supply Corps Officers who were used as survey respondents due to their positioning as a logistics and financial choke point between the man in the foxhole and their commanding officers. Using the value that Supply Officers are willing to pay for comprehensive and real time information, a value added figure is determined for the inclusion of RFID technology in the Department of Defense supply chain management infrastructure. Continuing with the aircraft carrier example, the value added figure is $11.28 per requisition.

THIS PAGE INTENTIONALLY LEFT BLANK

TABLE OF CONTENTS

I. INTRODUCTION....1
A. PURPOSE....1
B. WHAT IS RFID? 1
C. COURSE OF STUDY....3

II. WHY WE CAME TO THIS RESEARCH QUESTION....5
A. INTRODUCTION....5
B. ANECDOTES....6
C. COST AND BENEFIT 10
D. VALUE OF INFORMATION 13

III. METHODOLOGY 15
A. SURVEY 15
B. WHY THE SUPPLY OFFICER?....15
C. DATA COLLECTION 17
D. FOXHOLE....17
E. SURVEY 18
F. SURVEY RESPONSE....20

IV. RESULTS 21
A. PART I. PRELIMINARY DATA....21
B. PART II. SUPPLY CHAIN MANAGEMENT 29
C. PART III. BACKGROUND INFORMATION ON PARTS TRACKING SERVICES....46

V. DATA ANALYSIS....53
A. SURVEY SAYS…....53
B. IS LOGISTICS INFORMATION VALUABLE?....53
C. HOW MUCH ARE THEY WILLING TO SPEND FOR LOGISTICS INFORMATION?....55
D. SURVEY COMMENTS....58
E. RELEVANCE OF THE DEPARTMENT HEAD 59
F. HIDDEN COSTS 60

VI. CONCLUSION 63

APPENDIX A. SURVEY....65

APPENDIX B. SOURCE DATA SPREADSHEETS....71

APPENDIX C. SURVEY COMMENTS....81

LIST OF REFERENCES....89

INITIAL DISTRIBUTION LIST....91

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF FIGURES

Figure 1. Incremental Cost/Value 12
Figure 2. Community Data Chart 22
Figure 3. Command Type Chart 23
Figure 4. Overseas Command Chart 24
Figure 5. Job Title Chart 25
Figure 6. Track Parts Chart 26
Figure 7. Manage or Influence a Budget Chart 27
Figure 8. Budget Chart 29
Figure 9. Importance of Tracking Parts Chart 30
Figure 10. Time Used to Track Parts Deployed 31
Figure 11. Time Used to Track Parts at Home Base 32
Figure 12. Staff's time used to track parts while deployed 33
Figure 13. Staff's time used to track parts while at home base 34
Figure 14. Frequency of Updating Senior Deployed 35
Figure 15. Frequency of Updating Senior at Home Base 36
Figure 16. Status Query Logistics Data 38
Figure 17. Percent Breakdown of Status Query Logistics Data 39
Figure 18. Status query Top Data Fields 40
Figure 19. Percentage Breakdown of Status Query Top Data Fields 40
Figure 20. Percentage of Budget applied to Parts Tracking Service while deployed for Hi-Pri Parts 42
Figure 21. Percentage of Budget applied to Parts Tracking Service while deployed for Hi Pri and Low Pri Parts 43
Figure 22. Percentage of Budget applied to Parts Tracking Service while at Home Base for Hi Pri Parts 44
Figure 23. Percentage of Budget applied to Parts Tracking Service while at Home Base for All Parts (Hi and Low Pri) 45
Figure 24. Parts Tracking Resources 47
Figure 25. Ranking of Current DoD Tracking Systems Deployed 48
Figure 26. Ranking of Current DoD Tracking Systems at Home Base 49
Figure 27. Ranking of Commercial Tracking Services Deployed 50
Figure 28. Ranking of Commercial Tracking Services at Home Base 51
Figure 29. Average Time Spent Tracking Parts 54
Figure 30. % of CV/CVN Annual Budget Willing to Spend on Logistics Info 57
Figure 31 Survey Comment Themes 59

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF TABLES

Table 1. Community Data 22
Table 2. Command Type Frequency 23
Table 3. Number of responses from commands stationed overseas 24
Table 4. Respondents job positions 25
Table 5. Track Parts Yes/No 26
Table 6. Manage or Influence a Budget 27
Table 7. Size of Budget Managed 28
Table 8. Budget Midpoint 28
Table 9. Importance of Tracking Parts 29
Table 10. Time Used to Track Parts Deployed 30
Table 11. Time Used to Track Parts at Home Base 31
Table 12. Staff's time used to track parts while deployed 33
Table 13. Staff's time used to track parts while at home base 34
Table 14. Frequency of Updating Senior Deployed 35
Table 15. Frequency of Updating Senior at Home Base 36
Table 16. Commonly Requested Logistics Data Fields 38
Table 17. Preferred Logistics Data Fields 39
Table 18. Percentage of Budget applied to Parts Tracking Service while deployed for Hi Pri Parts 42
Table 19. Percentage of Budget applied to Parts Tracking Service while deployed for Hi Pri and Low Pri Parts 43
Table 20. Percentage of Budget applied to Parts Tracking Service while at Home Base for Hi Pri Parts 44
Table 21. Percentage of Budget applied to Parts Tracking Service while at Home Base for All Parts (Hi and Low Pri) 45
Table 22. Parts Tracking Resources 46
Table 23. Ranking of Current DoD Tracking System Deployed 48
Table 24. Ranking of Current DoD Tracking System at Home Base 49
Table 25. Ranking of Commercial Tracking Services Deployed 50
Table 26. Ranking of Commercial Tracking Services at Home Base 51
Table 27. Avg. Budget and % Allocation to RFID Logistics Info per Command Type 57
Table 28. Multiple Regression: SUPPO's to Budget 60

THIS PAGE INTENTIONALLY LEFT BLANK

LIST OF ACRONYMS AND ABBREVIATIONS

AFLSC	ATLANTIC FLEET LOGISTICS SUPPORT CENTER
AMC	AIR MOBILITY COMMAND
ANOR	ANTICIPATED NOT OPERATIONAL READY
AOE	AMMUNITION OIL EXPLOSIVES
ASD	AVIATION SUPPORT DIVISION
CASREP	CASUALTY
CG	CRUISER GUIDED MISSILE
CHENG	CHIEF ENGINEER
CHOP	SUPPLY OFFICER
CIC	COMBAT INFORMATION CENTER
CLF	COMBAT LOGISTICS FORCE
CMP	CONTINUOUS MONITORING PROGRAM
CO	COMMANDING OFFICER
CONUS	CONTINENTAL UNITED STATES
CRIF	CARGO ROUTING INFORMATION FILE
CRYPTO	CRYPTOLOGICAL
CV	CARRIER VESSEL
CVN	CARRIER VESSEL NUCLEAR
DD	DESTROYER
DDG	DESTROYER GUIDED MISSILE
DDNV	DEFENSE DISTRIBUTION DEPOT NORFOLK VIRGINIA
DH	DEPARTMENT HEAD
DLA	DEFENSE LOGISTICS AGENCY
DLR	DEPOT LEVEL REPAIRABLE
DOD	DEPARTMENT OF DEFENSE
EDD	ESTIMATED DELIVERY DATE
ESD	ESTIMATED SHIPPING DATE
FEDEX	FEDERAL EXPRESS
FFG	FAST FRIGATE GUIDED MISSILE
FISC	FLEET INDUSTRIAL SUPPLY CENTER
FPO	FLEET POST OFFICE
GATES	GLOBAL AIR TRANSPORTATION EXECUTION SYSTEM
GTN	GLOBAL TRANSPORTATION NETWORK
ICP	INVENTORY CONTROL POINT
INCONUS	IN CONTINENTAL UNITED STATES
INMARSAT	INTERNATIONAL MARITIME SATELLITE
ITV	INTRANSIT VISIBILITY
J4	JOINT LOGISTICS
LCC	AMPHIBIOUS COMMAND SHIP
LHD	AMPHIBIOUS ASSAULT SHIP HELICOPTER
LPD	AMPHIBIOUS TRANSPORT DOCK
LSD	AMPHIBIOUS LANDING SHIP

MILSTRIP	MILITARY STANDARD REQUISITIONING AND ISSUE SYSTEM
N4	NAVY LOGISTICS
NAS	NAVAL AIR STATION
NAVSTA	NAVAL STATION
NAVTRANS	NAVAL TRANSPORTATION SYSTEM
NIS	NOT IN STOCK
NORS	NOT OPERATIONAL READY SUPPLY
NPS	NAVAL POSTGRADUATE SCHOOL
OPTAR	OPERATING TARGET
OTHER	NON-REPAIR PART FUNDING
OCONUS	OUTSIDE CONTINENTAL UNITED STATES
PMO	PRIORITY MATERIAL OFFICE
PRI	PRIORITY
RF	RADIO FREQUENCY
RFID	RADIO FREQUENCY IDENTIFICATION DEVICE
S-8	SHIPBOARD SUPPLY MATERIAL DIVISION
SALTS	STREAMLINED AUTOMATED LOGISTICS TRANSMISSION SYSTEM
SEAL	SEA AIR LAND
SECDEF	SECRETARY OF DEFENSE
SHF	SATELLITE HIGH FREQUENCY
SK	STOREKEEPER
SOUTHCOM	SOUTHERN COMMAND
SUPPO	SUPPLY OFFICER
TAC	TRANSPORATION ACCOUNT CODES
TCN	TRANSPORTATION CONTROL NUMBER
TYCOM	TYPE COMMANDER
UPS	UNITED POSTAL SYSTEM
USAF	UNITED STATES AIR FORCE
USPACFLT	UNITED STATES PACIFIC COMMAND
WWX	WORLDWIDE FEDERAL EXPRESS CONTRACT
XO	EXECUTIVE OFFICER

ACKNOWLEDGEMENTS

LCDR Corrigan:

Amy, thank you very much for who you are. Thank you to my friends Steve Basilici and Mike Kenney, my project partner Jayson Kielar, and the two best professors at NPS, Nick Dew and David Henderson. Most of all I thank Jesus Christ, my Lord and my God.

LT Kielar:

I first would like to thank my wife April for withstanding all that I put her through while completing my studies at NPS. Secondly, I would like to thank my children for the patience and understanding they continually demonstrated while waiting for daddy to come home from school.

Professionally, I am very grateful for the tremendous assistance that Professors Dew and Henderson willingly gave to aid in our effort to complete this project. Staff support from the Type Commander's logisticians was invaluable. Finally, a hearty thanks to all that completed our survey and returned their reply.

THIS PAGE INTENTIONALLY LEFT BLANK

I. INTRODUCTION

A. PURPOSE

The purpose of this MBA project is to discover what comprehensive, accurate and near real time logistics information, provided via Radio Frequency Identification (RFID) technology, is worth to the "man in the foxhole". This project seeks to answer the basic question, "What would someone in the foxhole pay to have real time information concerning incoming critical materials and supplies?" If we know this value, we can determine if adopting new RFID technology might add value to some part of the supply chain.

This research question evolves from a premise: that RFID technology is a) deployable and b) capable of generating information that makes a difference. To say that a technology has the ability to increase the benefits to the military supply chain assumes that RFID is a "turn-key" technology available today for procurement and deployment.

The Secretary of Defense (SECDEF) has decided that RFID systems will be adopted by the Department of Defense. A memorandum dated 2 October 2003 set policy for RFID implementation on two paths. The first path calls for immediate implementation of RFID tags to meet Intransit Visibility (ITV) requirements for cargo shipped via container. The second path calls for all agencies in DoD to place passive RFID tags on pallets, cases and multi-packs.[1] However, what RFID is deployed on, where and who gets it and why they get it is still undecided. Also, the value of deploying RFID technology is undetermined within the various departments of DoD.

B. WHAT IS RFID?

Radio Frequency Identification is a technology that gives users the capability to track everything, anywhere, all the time. Using a smart label known as a radio frequency identification tag, commercial industry is able to track products from the assembly line, to the vendor and out the front door as they are purchased.[2] Whereas a bar code

---

[1] MacDonald, Steve CDR, "Radio Frequency Identification (RFID)", Point Paper, 4 November 2003.

[2] Sawyer, Gary, "Chips for Everything", New Scientist, 19 October, 2002, pp. 44-47

identifies the item it is attached to and is manually read with a scanner one at a time, an RFID tag can be read several feet away, in multiple numbers, without being in line of sight.

RFID systems consist of a reader with an antenna and a transponder referred to as an RFID tag. The antenna on the reader emits a radio wave that activates the RFID tag. An RFID reader can scan every item in a container or storage unit simultaneously. If connected to the Internet, the readers can upload their scanned data instantly allowing Internet users to identify which part is in what box and where exactly in the world a part is.[3]

The significance of RFID is the amount of data that can be written to an RFID tag and the ease of collecting and transferring data from the tags in mass. Currently, up to 1MB of data can be written to an RFID tag. This level of data input allows for significant storage of logistics information for each unit of material shipped. Due to the ease of data transfer and storage using RFID, having real-time worldwide logistics status for all parts and material in the Supply Chain is becoming closer to reality.

The United States military is considered the largest consumer of RFID technology today, having invested $272 million into creating an RFID logistics tracking system. The Army Material Command successfully used RFID during Operation IRAQI Freedom to track critical cargo and material. With this successful trial under fire, the Department of Defense is poised to expand RFID capability to the component level in addition to its use as an instant storeroom inventory tool.

With the inevitable adoption of RFID into all departments of the military, managers must decide how embedded RFID technology will be integrated into logistics and supply systems. Again, the purpose of this MBA project is to determine what updated and accurate logistics information made available through the use of RFID technology about incoming supplies is worth to the "man in the foxhole".

---

[3] Booth-Thomas, Cathy, "The See it All Chip", Time Magazine, New York, 22 September,2003, pp.8-16

C. COURSE OF STUDY

The basic question of this project is established. Next, the method used to obtain the information required to answer the project's questions are identified and explained. The data obtained are analyzed in order to answer the questions: a) What is the value of logistics information to the warfighter? b) What is the warfighter or "the man in the foxhole" willing to pay for that information? and c) What is the added value for the inclusion of RFID technology into the DoD logistics infrastructure?

THIS PAGE INTENTIONALLY LEFT BLANK

II. WHY WE CAME TO THIS RESEARCH QUESTION

A. INTRODUCTION

In a combat situation, every order, movement and procedure becomes more important. Due to the finality of failure, every decision made by the warfighter has to be almost perfect and every action almost flawless. Logistics decisions take on the same level of importance as strategic planning and tactical maneuvering. Due to the critical nature of combat, having the warfighter or "man in the foxhole" place a value on logistics information is not as easy as it seems.

For example, a tank commander in enemy territory has been ordered to reposition his assets for the purpose of out flanking the adversary. In his unit, three tanks urgently need spare parts. If his maintenance technicians or mechanics are unable to obtain the parts quickly, the disabled tanks will be unable to participate in the maneuver. What the urgent repair parts are is not important in this example. What is important is the fact that the parts are critical for the warfighter to complete his mission. In this situation, what do you think the tank commander is willing to pay for reliable logistics such as the current location of those parts and when he will receive them? If you said, "Whatever it takes," you would be correct. This is precisely what the researchers have heard time and again from the captain of their submarine or ship while operating at the tip of the spear.

The key "take away" from the tank commander example is that in certain situations and conditions, the value of money and other resources becomes secondary compared to another critical commodity. In this case, the other critical commodity is information. If the warfighter had access to a system such as RFID that could provide instant real-time data on where critical parts and supplies are, he could focus on other aspects of his mission.

US Navy personnel find themselves in the same predicament as tank commanders. It is not uncommon for a sailor to hear his commanding officer say, "Not only do I want to know when my part will be here, I want to know the name of the guy that loaded it on the airplane and what he had for lunch." The ship driver is a bona fide warfighter with incredible pressure to perform a mission much like the proverbial "man

in the foxhole." The Navy Supply Officer (SUPPO or Chop) is situated in that foxhole next to his ship-driving comrades. The ship drivers are his up close and personal customers. He shares the pain as if he were the tank commander or the ship driver. The SUPPO department head (DH) is under pressure to provide those urgently needed repair parts so his unit can perform maneuvers as ordered by higher authority.

B. ANECDOTES

I (CJC) recall my third week on the ship as the newly reported SUPPO--one of the commanding officer's (CO) four department heads. A high-priority requirement for a circuit card popped up. The Combat Information Center (Combat) needed it before sailing early Monday morning. It was Friday night and I was already late for dinner, again.

The CO summoned me to his stateroom where he and the combat systems officer were sitting down. The captain was even newer than I, having reported two weeks after I had. He said, "Chop, we really need you to score this part. I know you don't have much time, but I have to get the ship underway early Monday morning and we can't shoot the guns without that circuit card. Call me when you have it in hand." My automatic reply was, "Aye-aye, sir."

I was on a mission--the first of many under this captain. My storekeeper (SK) did a fine job locating the badly needed part at a supply depot in Pennsylvania. She instructed them to immediately FedEx the part to the ship. The rest was up to the duty storekeeper to keep tabs on the part's shipping progress while I headed home.

Later that night, I called the ship to check on the latest status of the part and was informed that it would be in the region by Saturday night at the earliest. Most likely we would be able to put our hands on it via the local warehouse Monday before lunchtime. This was a red flag...Murphy was sure to pay us a visit. I thought to myself, *if we don't have the part in hand Saturday, Monday is too late!* From home, I got on the phone and attempted to undo the FedEx arrangements. After numerous long distance phone calls to track down exactly who had the part and where it was, I then had to change the current shipping plan to get it faster--and it had to be a sure thing!

Two hours later and with much frustration, I finally completed arrangements for the part to be flown on a commercial plane to the Jacksonville airport. This expediting trick of the trade is called the "counter-to-counter process" and it's a fairly unorthodox method of obtaining parts more quickly. But, desperate circumstances call for desperate measures--especially by the new guy.

I received about five follow-up phone calls from the duty storekeeper on the status of the circuit card throughout the night, waking the baby only once. In the morning, I called the ship and found out all went as planned. The duty storekeeper made the two-hour roundtrip to the airport to retrieve the part. It was turned over to combat personnel to perform the needed repair.

I was so excited from the good news that I quickly dialed my captain's number. When he picked up the phone, I told him about our small victory and along the way I may have even patted the supply team on the back. When I paused, he said, "that's super, Chop, perhaps you should call the current captain; I'm sure he'll be delighted." Dang! In my haste, I still had the previous captain's number on speed dial!

Here's another sea story. We were approaching the Greek coast and I (CJC) got another call that the engineers needed a pump real bad. The pump was ordered some time ago and was already enroute. However, we didn't know its current location or when we could get our hands on it. Those were the $64,000 questions.

I made some preliminary phone calls and emails and the pump appeared to be headed for Souda Bay, Greece soon. I relayed this incomplete but promising information to the chief engineer (Cheng) and the Captain. I figured we would be able to get more specifics once we were pier side and had reliable landlines to interface with the local U.S. Navy supply department. This was my first wrong assumption. If only the Internet had an RFID link, I could pinpoint everything about this part.

I had duty the first day in port (Monday) and spent much of my time dealing with the typical onslaught of food and other general supplies that chase the ship around the Mediterranean. The pier was piled high, which would keep all hands busy for some time.

One of the SKs was getting updated information on the pump over the phone from Norfolk, VA. I was told it would be on an airplane and land in Souda Bay on Tuesday at 11:45 am local time. How reliable do you think this information was? After clearing the pier and being satisfied with the pump information, I headed out to the see the local sights with my liberty buddy, Cheng.

That same afternoon I used my cell phone to check with the duty SK about the pump. He said the flight arrived but the pump was not on the flight. This was not good, so Cheng and I returned to the ship immediately. We lost our money on our hotel reservation and would be sleeping on the ship that night. If all went well, we could still make our scuba diving trip the following day at 6 am.

I made many local and long distance phone calls. I had points of contact in Greece, Bahrain, Italy, Spain, and the U.S. No one could tell me where the pump was located. Cheng reminded me he absolutely had to have it—what else was new? As the story goes, the ship departed port without the pump onboard and Cheng and I never made our diving trip. So, we missed out on a good adventure, lost our deposit, and had to eat three meals a day across from an unhappy CO.

Thinking back to the research question, what do you think I, my CO or our Commodore would have been willing to pay for accurate logistics information?

A few hours after being out to sea I received an email that the pump was going to arrive via air in Souda Bay at midnight. Again, how reliable was this information? I immediately notified the local supply department in Souda Bay to make sure they knew what I knew. Reluctantly, I updated the Captain. He responded non-verbally with his infamous eagle eye look

The ship was not allowed to return to port without diplomatic clearance, which takes a minimum of 48 to 72 hours to obtain. It takes even longer when a weekend or holiday is involved. After repeated attempts to cut through the red tape, we had no choice but to remain at sea. Without this pump, the ship could not proceed to our primary task, so we cut circles in the water just off the coast of Greece. The next day I told the local supply department that we would send in a small boat to retrieve the part since we could not wait for approval to fly the helicopter in or bring the ship pier side.

I confirmed that the logistic flight in fact arrived in Souda Bay, so the Captain ordered the small boat to depart for the beach. Several hours later the boat returned without the part—again, not good! No one in the local supply department knew where the part was. I thought to myself, *this couldn't be happening.* Would I walk the plank now or after dinner? I called Souda Bay supply from the ship but could not get anyone to answer the phone. This was unnerving. The Commodore was all over the Captain for answers and we had nothing.

Since the Commodore does not have the necessary or timely information he requires or, perhaps he has faulty information, what kind of mistakes will he make when making decisions based on judgments about incoming supplies?

I have to wonder, *would RFID technology have helped to prevent or resolve this SNAFU?* Knowing that RFID scanners have the capability to detect the pump as it departs the aircraft, detect it entering the warehouse, and, finally, detect the pump when it's in it's proper location is enough to answer that question. Just knowing that the pump was loaded on the aircraft and then offloaded in Souda Bay is enough to make better decisions. But these were data points I could only fantasize about.

What if a well-meaning SK placed the pump under his desk for "safe holding" because he knew a stressed out SUPPO was on the hunt for it? With RFID, he would not be able to disrupt the flow of information available on the Internet because the pump's movement would have already been recorded and confirmed. I would know the pump departed the aircraft's fuselage in Souda Bay. However, finding the pump would still be problematic if this well-meaning SK had to undergo an emergency appendectomy while my pump remained "safely" under his desk.

Ah, but having reliable information is worth its weight in gold to this SUPPO. That is, it would be an indisputable fact that the pump exited the aircraft in Souda Bay. But since the part could be located under the SKs desk, a small search party can be formed. Armed with the information that RFID can provide, the search party would have assurance that they were searching the correct area (Souda) vice what I was doing…calling every point of contact in the Western Hemisphere.

Early the next morning I received an email from a junior supply clerk in Souda Bay. In a rather chipper tone, he exclaimed that he located my pump and was standing by for further instruction. Great news! A week had now elapsed and I lost unspeakable amounts of sleep, years off my life, a possible demotion to head butter cutter, not to mention the money Cheng and I lost in Souda Bay. Now, all we had to do was make another small boat stealth run to Souda Bay.

I began to wonder if this would be the right pump. Did the engineers make any mistakes ordering it? Did my SKs properly edit the requisition paperwork when it was first ordered? Did the supply system issue an alternate pump that was not a suitable substitute that the engineers could use? Maybe I would walk that plank after all? Maybe the Cheng, my trusty liberty buddy, would join me. After all the pain of not knowing where the part was or when we would receive it, perhaps I would have even more pain to endure such as performing this entire charade over again. Knowing what I know about RFID's potential, I feel naked tracking parts without it!

What do these stories have to do with RFID? The first is that the authors want the reader to empathize somewhat with the challenges supply officers face in finding and tracking parts for their customers, the warfighters. Our heart is really in it. Their pain is our pain and we'd like to think it's mutual! Having accurate information about coming supplies has a value to all stakeholders directly and indirectly. Secondly, RFID is a new and improved tool for use in the battle arena. It has the potential to solve some of the problems identified above. It's not a panacea, but it can provide measurable value.

C. COST AND BENEFIT

Does RFID contain value? If the price of a good or service exceeds the amount a buyer is willing to pay, then an exchange will not occur in the market place. Conversely, if the price of a good or service is at or under what a buyer is willing to pay, then an exchange will occur. For example, if a widget sells for $1, then there is a market for that item. That is, the seller and the buyer performed an exchange because each of them perceived they obtained some benefit. If an exchange does not occur, then there is no market for that good or service.

There is not a market for every good and service. There are numerous variables that affect the buyer and seller such as cultural, income, gender, nationality, and so on. For example, fish eyes may bring a handsome price in a market in Vietnam and in an Eskimo village, but it is highly doubtful there will be a market (no buyer) in Springfield, Missouri. This, of course, assumes there are no Eskimos and Vietnamese or other fish eye consumers in Springfield.

Regarding consumers of logistics information, Chapter V analysis will show that both the respondents (SUPPOs) and those they represent (warfighters) are indeed consuming logistics information, they pay for it, and they are willing to pay even more money for better logistics information. The additional logistics information available through RFID technology is the incremental increase in benefit that this project examined.

What is value added? To piggyback on the above example, perhaps some hot sauce would be added value for a fish eye consumer. The fish eyes are already a tasty treat, but wouldn't they taste a little better with some hot sauce? The hot sauce is the added value to an already valuable good provided that the buyer and seller agree on terms.

There is already a cost to the current logistics information infrastructure. One needs to look no further than the Supply Corps *One Touch Supply* website where there are dozens of web-enabled logistics information systems around the globe. All of this comes at a cost to the American taxpayer.

This project aims to find out how much more the decision maker is willing to pay to have better information. This is graphically depicted in Figure 1. The researchers are interested in knowing what the incremental cost is above the established cost or price of logistics information.

Costs and benefits go hand in hand. The added potential benefits that RFID technology offers are as follows:

A. Reduced labor

a. Includes SUPPOs, their staff, and the shore establishments

B. Reduced parts consumption

a. Fewer parts ordered

i. Fewer carcass charges

ii. Fewer parts lost

b. Higher parts availability (NIS/fewer stock outs)

c. Reduced emergency spare parts contracts

d. Saved money

C. Better information; reduced uncertainty

a. Higher force readiness

b. Better decision making

Reduced labor, reduced parts consumption and better information all work together to effect operational capability in hostile environments. Little things can sometimes have big effects, such as not knowing when a gun circuit card or a pump will arrive. The uncertainty about incoming supplies puts real constraints on the commander's decision making, which effects overall operations.

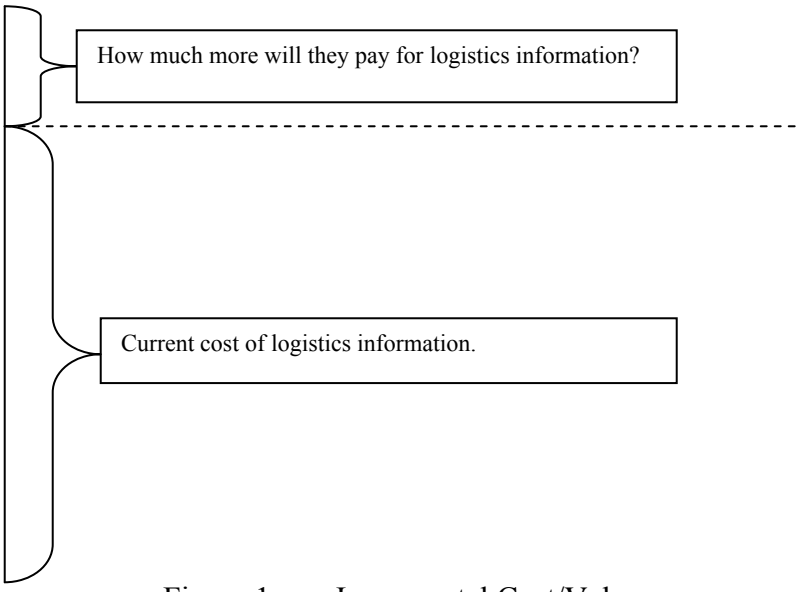

Figure 1. Incremental Cost/Value

D. VALUE OF INFORMATION

The researchers want to know whether and how the value of information changes with the circumstances. Does logistics information, for example, become more valuable once a unit deploys away from homeport? Chapter III describes the process of obtaining this information. Readiness and mission capability are the main concerns of the warfighter. Deployed versus not deployed affects the cost to obtain logistics information.

Senior officers tend to be sensitive to where and when incoming parts will arrive. The warfighter, or the "man in the foxhole" generates the requirement that creates the need for the SUPPO to procure material. The SUPPO tasked with getting supplies onboard is placed in the middle of two forces: the warfighter ordering supplies to prosecute his mission, and the senior supply officer or CO, whose main function is to ensure that the warfighter succeeds in his endeavors. Warfighter success depends on parts, fuel, and food to carry the fight to the enemy.

Survey questions 12 and 13 were used to discover the importance of logistics information to the SUPPO's boss. How frequently the SUPPO updates his boss on parts status depends on whether the ship is deployed or at home base.

And finally, SUPPOs may hold the purse strings, but it is the warfighter who ultimately directs how and when funds are spent. The CO and his SUPPO will not hesitate to spend whatever funds and man-hours are necessary to expedite a critical repair part. The SUPPO is the warfighter's best instrument to execute logistics orders.

THIS PAGE INTENTIONALLY LEFT BLANK

III. METHODOLOGY

A. SURVEY

The most effective and inexpensive method to gather the necessary information to properly answer the research questions is to assemble a written survey. Personal interviews were considered in order to mine the potential sources of information, but this would have taken too much time and yielded too small a sample. It was determined that the sample group would respond best to a written survey for the purposes of this project.

B. WHY THE SUPPLY OFFICER?

Ideally, to get the foxhole perspective, an interview or survey from the warfighter directly might provide the fidelity needed to complete this study. This approach would include soldiers and marines actually bearing arms. However, the researchers decided to target Navy supply officers.

The most direct naval warfighter might be considered the SEAL since he has boots on the ground. The next group of warfighters is the unrestricted line officers. These are the men and women driving ships, submarines and flying airplanes. They are at the tip of the spear for the navy.

The Navy Supply Corps Officer serves in virtually every command and unit under the direction of a warfighter. These officers are the direct link to their brethren warfighters, providing any and all material, from beans to bullets, needed to wage war. Granted, SUPPOs do not make war; however, they make it possible.

Hostility, or in the case of this research project, a deployed ship, means that the man in the foxhole/ship driver has a different perspective on value than the SUPPO. The SUPPO in turn has a different perspective than the little old lady in tennis shoes following up the SUPPOs requests for parts status in Mechanicsburg, PA. However, the SUPPO is the ideal candidate for this study. He runs a department that has dozens of equipment systems vital to crew moral. If the refrigerators are down, it is the SUPPO that feels the pain as much as the engineers performing the maintenance. SUPPO has the added responsibility of having to decide if money should be spent to fix items or make a capital investment. Either way, if deployed, the SUPPO must order, expedite, and track

these parts from start to finish. This includes all customs paperwork, setting up advance notice, making HAZMAT declarations, and finally, physically getting the part onboard. This might include arranging a helicopter, boat service at sea, a pier side crane, or special postal considerations.

The SUPPO must balance crew comfort, prudent budgeting, and maintenance support decisions. If outside technical assistance is needed, this will fall on the SUPPO's shoulders to arrange.

The SUPPO is the budget executer. In doing so, SUPPO is carrying out the planning and programming direction that was arrived at by consensus with the CO, XO and DHs. The SUPPO is empowered to carry out the necessary internal budgetary details of supporting the overarching goals set forth by the warfighters, which implies a significant amount of control on the part of the SUPPO.

The warfighter has certain expectations of SUPPOs. Warfighters need things that only the SUPPO can provide. Sometimes those needs are urgent and this sense of urgency must be passed to the SUPPO. In turn, the SUPPO must assume the same sense of urgency or there will be a breach in trust and confidence. SUPPOs cannot be lackadaisical when the ship needs tools or Tomahawk missiles.

Requests for supplies usually originate from the lower ranks. The SUPPO's duty is to honor all requests as if they came from the CO. Of course, there is a system of checks and balances that include budget limits and bona fide needs. However, neither the SUPPO nor his staff can arbitrarily cancel or deny requisitions for material. This would be like a physician who does not honor his creed to "do no harm".

The SUPPO, in short, is the direct link to the naval warfighter. He is the choke point and is best able to address all sides of the issue of cost and benefit. This study is based on a survey of SUPPOs who directly and intimately represent their warfighting counterparts. SUPPOs are no further from, and no closer to, harm from a mine or missile than any other sailor on the warship. All hands share equally in the potential perils at sea. Battlefields may have a safe rear area; ships do not have such a luxury.

C. DATA COLLECTION

An anonymous survey was created (see appendix A) and sent to 230 *readiness* supply officers and chief petty officers. Ninety-five surveys were returned out of a total of 230 for a return rate of 41%. Only the first 85 surveys returned were used for data analysis. Ten more surveys trickled in later and were not used. Email and mail were inexpensive methods to conduct a survey that produced a fairly satisfactory response rate in a short amount of time. It took just two weeks for 85 surveys to be returned. The last 10 surveys arrived between 14 days and 30 days after the initial transmission. The researchers did not send any reminders to the sample group.

Of the 230 surveys sent, 9 were mailed to submarine units. Nine of those 9 were received for a 100% return rate. The reason for this high return rate was that the surveys were mailed to one point of contact who personally observed the surveys being completed at a weekly training session and then mailed them back to the researchers.

Written surveys had the advantage of removing personal bias that can be present in a personal interview. However, they do not allow for deeper probing for more detailed information. Because of that limit, the survey included options for respondents to write in their own answer if they did not see a suitable one. This occurred in questions 1, 2, 3, 5, 12, 13, 14, and 16. Additionally, question 15 asked why the respondent answered a certain way and part IV requested additional information and comments.

The cover letter informed the sample group that the Naval Postgraduate School (NPS), in support of the Navy department and DoD, sponsored the survey. Therefore, credible sponsorship probably contributed to the fairly high response rate of 41%.

D. FOXHOLE

The researchers and the principal investigator agreed to survey only those SUPPOS who are currently serving in billets that support warfighters. This was done to gather the most current data available from incumbents currently immersed in the job. It also avoids the potential problem of surveying individuals who rely on memory and past experiences that may detract from the accuracy and validity of survey responses.

There are two main categories of SUPPOs, "readiness" and "services" supply officers. Readiness SUPPOs are responsible for managing inventories, expediting parts requisitions and managing finances in direct support to the warfighter's task of employing bombs, bullets, and troops against the enemy. Services officers handle the remaining support roles for the warfighter such as postal, pay, food service, hotel, laundry, haircuts, and sundries.

The survey targeted only readiness officers as evidenced in the questions in Part I, Preliminary Data, also known as demographics. Specifically, questions one to eight allowed the researchers to identify SUPPOs directly in control of parts and finances related to their command. Only one survey was returned from a services officer. This was acceptable because this individual was in charge of a budget and tracked some parts, albeit a small amount.

Also, the language of the cover letter and the accompanying email were aimed at readiness officers and senior readiness personnel. If non-readiness supply personnel filled out the survey, the researchers can identify them by responses to questions five and six.

E. SURVEY

The 95 returned surveys produced an accurate pool of reliable data. Zero surveys were returned from people not in the target group (with the one exception identified above); the researchers know this because they knew the email addresses, titles/positions, and specific commands of the sample group. The researchers obtained the email addresses of 230 supply corps officers from the Type Commanders. The sample of respondents represents SUPPOs currently in the fleet, many of whom were actually deployed, managing budgets, tracking and expediting parts on a continuous basis, and feeding this information to the warfighters.

The survey was anonymous and the researchers promised the respondents in the body of the cover letter that they would not share survey responses with anyone. This was necessary because the respondents were identifiable in the address section of their email replies. The chance that a survey was not filled out by someone in the sample group is practically nil. This must be addressed because this occurs when conducting a

mass mailing survey. One may never know, for example, if a wife is filling out a survey in the name of the husband. This was a non-issue in this survey.

The specific steps in developing the survey were as follows:

1) Devise goal/research question
2) Design methodology
3) Determine feasibility
4) Select sample
5) Conduct pilot tests
6) Revise as necessary
7) E-mail/mail surveys
8) Collect and analyze data
9) Report findings

Constructing the survey consumed the majority of this project's time. The survey went through several iterations until it was pared down to 18 questions and two pages plus a third blank page for section IV for any additional comments. A pilot group on the campus of Naval Postgraduate School (NPS) tested out the survey, allowing the researchers to receive instant feedback on various issues with the survey. The goal was not only to have relevant questions, but to pay attention to brevity as well. A cover letter explained the purpose and included the signatures of the researchers and the advisors.

Follow-up correspondence was not conducted nor was a deadline specified since the sample group was fellow supply corps officers. Hopefully this influenced the sample group to reply promptly. The researchers certainly knew their audience, which is important. It is more difficult to conduct a survey of a heterogeneous group. Likewise, the target audience knew that the researchers had previously served in readiness supply officer billets. Additionally, many of the SUPPOs targeted will soon be engaged in postgraduate studies and others have likely completed studies at NPS. So, perhaps there was an increased amount of empathy and cooperation for the researchers.

Regarding non-response bias, it is unlikely there is a difference between the respondents and non-respondents. The demographic characteristics among the sample were very similar. That is, the subculture of navy supply corps officers may show typical

variations within the peer group, but as a group, the responses received should not differ greatly from the responses that were not submitted. If the sample group had included other branches such as Army and Air Force, then the idea of non-response bias should be considered.

F. SURVEY RESPONSE

The survey respondents included 78 officers (92%) and 7 Chiefs (8%). Forty-one, or 48%, of the 85 officer respondents were department heads. This survey could almost be considered convenience sampling because the target group was easily identifiable and accessible. The researchers were tempted to survey the readily accessible pool of SUPPOs at NPS. Although convenient, it was decided not to target this group for the reasons cited earlier. The most inconvenient sample group to survey would have been supply officers in the other services to represent the DoD as a whole. The researchers did not have ready access to this group; however, they should be considered for further research.

IV. RESULTS

This chapter reviews the responses received from the RFID survey. Chapter V contains more extensive analysis of the survey data. The responses were consolidated into a sample using the Microsoft Excel spreadsheet program and are included for review in Appendix B. The data are reviewed in similar fashion as the questions were written and as they appeared in the survey. Any pertinent information or explanation of the questions from the survey is included as necessary.

A. PART I. PRELIMINARY DATA

> **Question 1.** Are You? USA (Army), USN (Navy), USMC (Marine Corps), USAF (Air Force), USCG (Coast Guard) or Other.

This question asked the respondent to identify their branch of military service. Every respondent answered, "USN."

An even distribution of responses from each of the military services would conceivably provide the preferred sample for this project. Unfortunately, time and resource constraints prevented meaningful contact and cooperation with the other services. The survey is included as Appendix A for those who wish to refer to the survey itself or desire to continue this line of research using other military services. With that said, a concentration of responses from naval personnel actively engaged in material expediting, particularly Supply Officers, should provide answers to the research questions in this project that reasonably reflect the DoD as a whole.

> **Question 2.** Are You? Line Officer (warfighter) Staff Corps (Staff Support) Other.

Question Two asks about the respondent's community. Each community may have a different perspective on parts expediting and financial management. Knowing which community a survey participant is from provides insight into the reasoning behind how the questions were answered and why.

In Question Two, a large majority of the sample consists of Staff Corps Officers. In this case the Staff Officers are Supply Officers. The others are senior enlisted

personnel engaged in material requisitioning and expediting. The importance of logistics requirements are well ingrained in their day-to-day tasking and function. They may influence and indeed manage a budget depending on their position and command. Their key difference from the Supply Officer is that they are not held accountable or responsible for the successes or failures in their organization.

Community	Frequency	Relative Frequency	Percent Frequency
Line Officer (1)	0	0	-
Staff Officer (2)	75	0.88	88.24
Other (3)	10	0.12	11.76
Sum	85	1	100.00

Table 1. Community Data

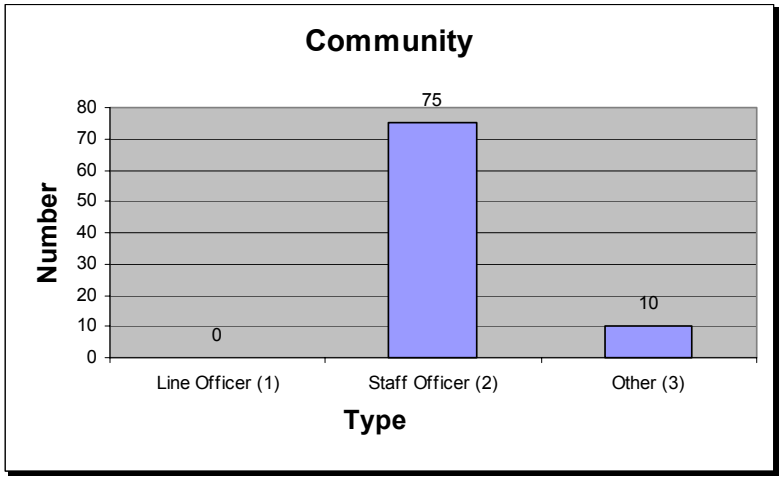

Figure 2. Community Data Chart

Question 3. Describe your command, e.g., (sub, frigate, carrier, division, battalion, squadron.).

Identifying the type of command the respondent comes from helps to understand the relevance of answers to questions that follow. For example, if someone is from a frigate, the size of his or her budget should correspond to the size of budget typically associated with a frigate.

Command Type	Frequency	Relative Frequency	Percent Frequency
Air Station	2	0.02	2.35
AOE	3	0.04	3.53
ASD	1	0.01	1.18
CG	4	0.05	4.71
CV/CVN	28	0.33	32.94
DDG	12	0.14	14.12
FFG	4	0.05	4.71
LCC	1	0.01	1.18
LHD	3	0.04	3.53
LPD	1	0.01	1.18
USPACFLT	1	0.01	1.18
TYCOM	2	0.02	2.35
SUB Squadron	2	0.02	2.35
SUB	7	0.08	8.24
NAV Staff	1	0.01	1.18
NAS	1	0.01	1.18
LSD	4	0.05	4.71
NAVSTA	7	0.08	8.24
Type Wing	1	0.01	1.18
	85	1.00	100.00

Table 2. Command Type Frequency

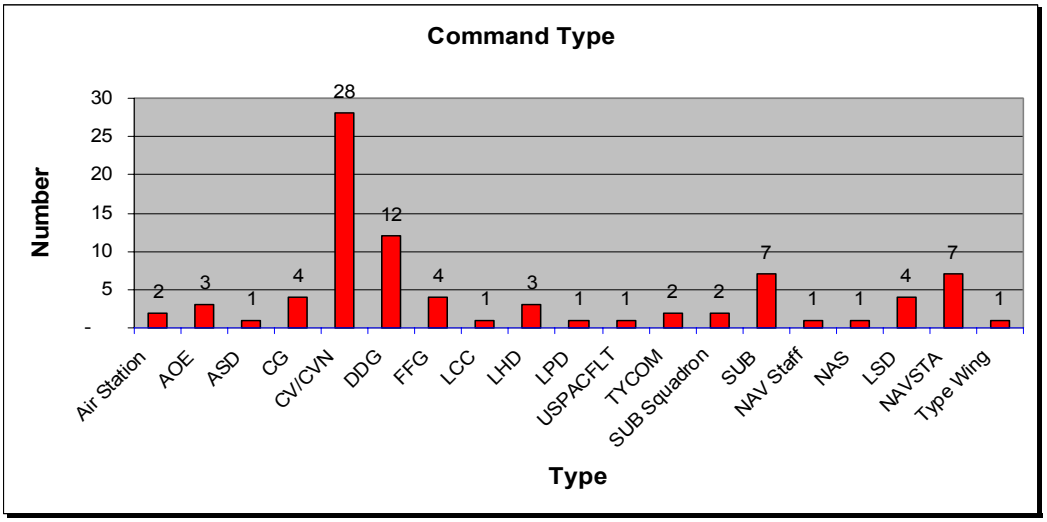

Figure 3. Command Type Chart

Question 4. Is this command permanently stationed overseas? (Yes/No)

If a command is overseas, it is considered forward deployed. Being considered first responders to world events, commands stationed overseas may respond differently to later questions than those stationed in the continental United States. Due to their location, and the resulting time-distance problem, logistics requirements have

significantly more impact on readiness than commands that are based in the U.S. As a result, the supply system places a higher priority on material destined for overseas commands. Units based in the continental U.S. enjoy this same level of priority when they deploy overseas.

Overseas Command?	Frequency	Relative Frequency	Percent Frequency
Yes (1)	20	0.24	23.53
No (2)	65	0.76	76.47
Sum	85	1	100.00

Table 3. Number of responses from commands stationed overseas

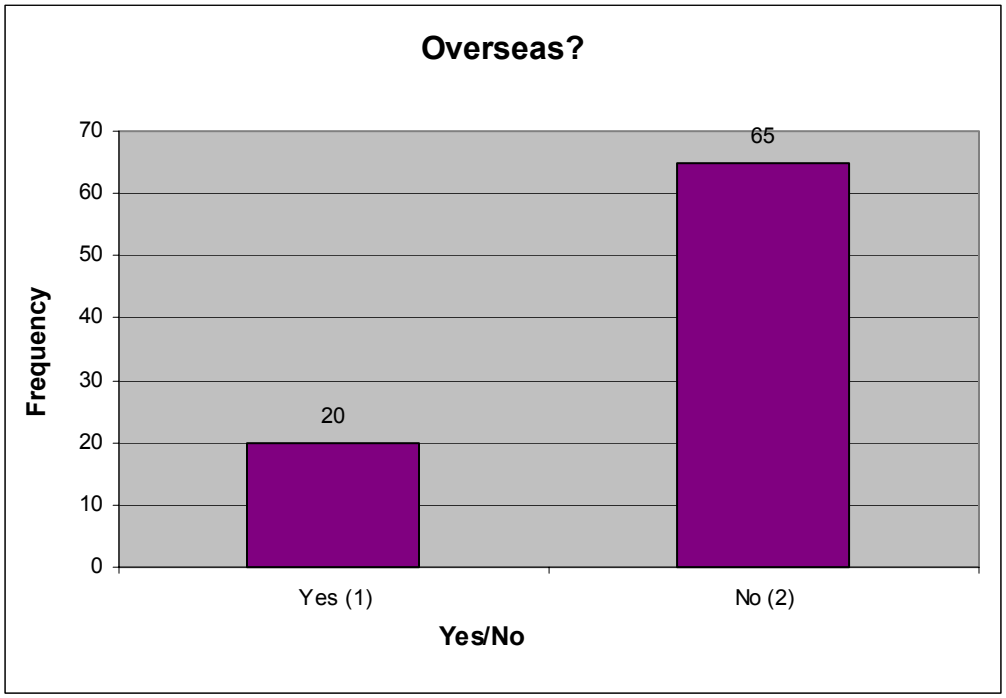

Figure 4. Overseas Command Chart

Question 5. What is your job position or title?

The position held can effect the respondent's perception of his logistics situation and thus affect his responses in follow-on questions.

Job Title	Frequency	Relative Frequency	Percent Frequency
AS/IMA Support	1	0.01	1.18
ASD Officer	1	0.01	1.18
ASUPPO	6	0.07	7.06
AVDLR Officer	2	0.02	2.35
Aviation Support	4	0.05	4.71
CPO	2	0.02	2.35
Deputy of Log.	1	0.01	1.18
DIVO	1	0.01	1.18
Hazmat Officer	2	0.02	2.35
ILS Officer	1	0.01	1.18
Leading SK	1	0.01	1.18
PAL	3	0.04	3.53
S-1 LCPO	1	0.01	1.18
S-6 LCPO	1	0.01	1.18
S-8 DIVO	1	0.01	1.18
SERVO	3	0.04	3.53
Staff	1	0.01	1.18
Stock Control	5	0.06	5.88
Stores LCPO	1	0.01	1.18
Stores Officer	1	0.01	1.18
Supply LCPO	3	0.04	3.53
SUPPO	41	0.48	48.24
Air Logistics Officer	1	0.01	1.18
SUP OPS	1	0.01	1.18
	85	1.00	100.00

Table 4. Respondents job positions

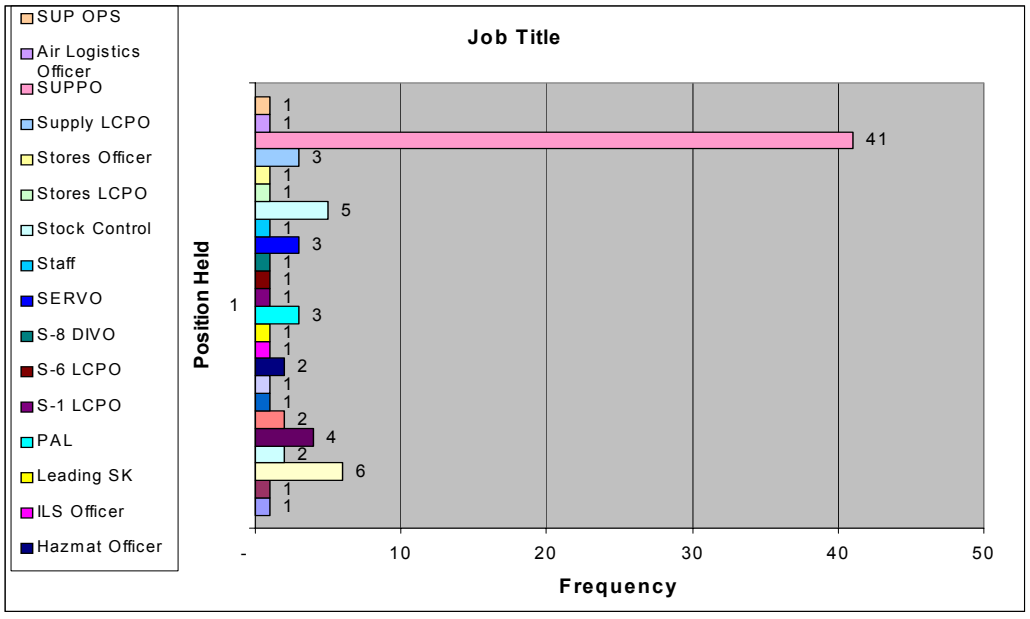

Figure 5. Job Title Chart

Question 6. Do you track parts and/or requisition status? (Yes/No)

Asking whether or not a respondent tracks parts measures or determines the existence of a legitimate concern for logistics information and updated material status. If a respondent has nothing to do with purchasing and delivering material in a condensed time frame, he or she most likely will not have a feel for the value of logistics information.

Track Parts and Status?	Frequency	Relative Frequency	Percent Frequency
Yes (1)	79	0.93	92.94
No (2)	6	0.07	7.06
Sum	85	1	100.00

Table 5. Track Parts Yes/No

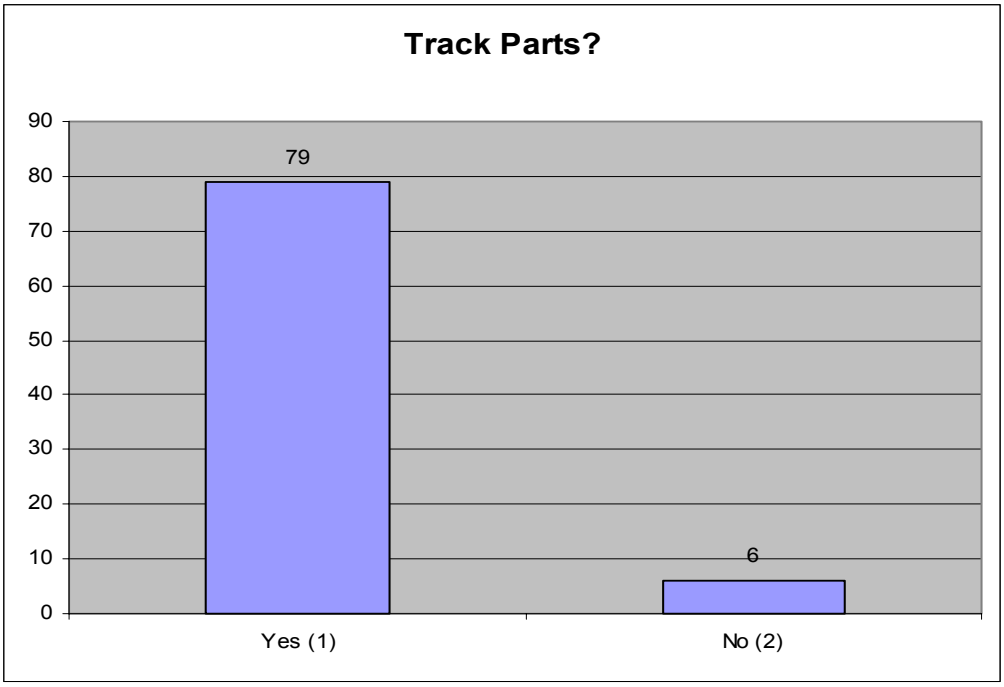

Figure 6. Track Parts Chart

Question 7. Do you manage or directly influence a budget? (Yes/No)

This question pertains to follow-on questions concerning what size budget is managed and the percentage of the budget applied to obtaining logistics information.

Whether the respondent answers yes or no validates his answers to follow-on questions. Additionally, as in Question Six, if a respondent has nothing to do with managing or directly influencing a budget, he or she most likely will not have a feel for the value of logistics information.

Manage or Influence a Budget?	Frequency	Relative Frequency	Percent Frequency
Yes (1)	77	0.91	90.59
No (2)	8	0.09	9.41
Sum	85	1	100.00

Table 6. Manage or Influence a Budget

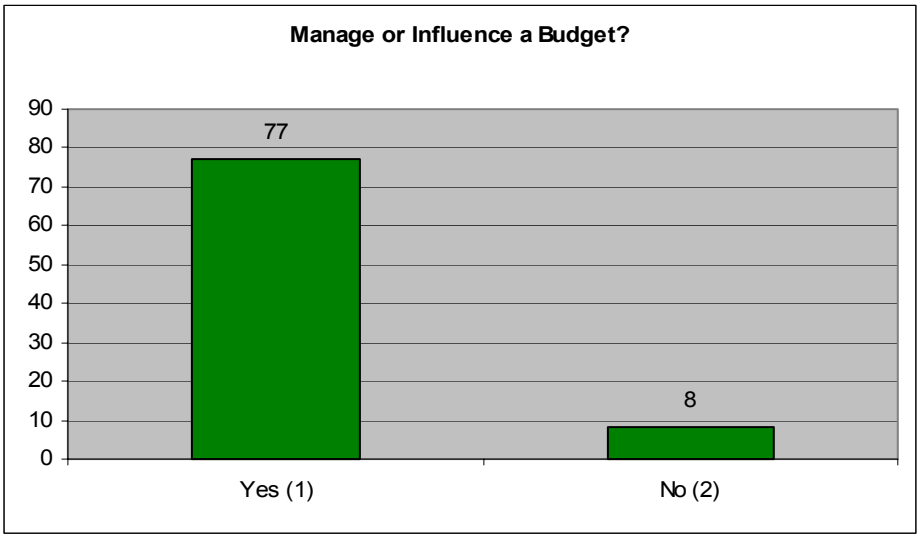

Figure 7. Manage or Influence a Budget Chart

Question 8. What is the size of the total annual budget you manage? <$50K $50K - $999K $1M - $5.99M $6M - $25M >$25M-$50M >$50M

When combined with the percentage of his budget that the respondent would apply to obtaining logistics information, a useful figure can be derived for how much money would be applied to obtaining logistics information. Exact budget size information was deemed too sensitive to request during the survey creation process.

Size of Annual Budget	Frequency	Relative Frequency	Percent Frequency
<$50K (1)	1	0.01	1.18
$50K - $999K (2)	3	0.04	3.53
$1M - $5.99M (3)	39	0.46	45.88
$6M - $25M (4)	15	0.18	17.65
>$25M - $50M (5)	6	0.07	7.06
>$50M (6)	14	0.16	16.47
N/A	7	0.08	8.24
SUM	85	1.00	100.00

Table 7. Size of Budget Managed

Midpoint of Budget Size	Midpoint X Frequency
$ 25,000	$ 25,000
$ 525,000	$ 1,574,999
$ 3,500,000	$ 136,499,981
$ 15,500,000	$ 232,500,000
$ 37,500,000	$ 225,000,000
$ 62,500,000	$ 875,000,000
SUM	$ 1,470,599,979
Budget Average--> of 78 surveys	$ 18,853,845.88

Table 8. Budget Midpoint

The budget midpoint is used as a reference point for use in calculations to support data analysis. The sample size is 85. The budget average uses 78 surveys. Seven responses answered N/A to question number eight.

Thirty-nine individuals selected the $1M to $5.99M range. This corresponds to SUPPOs attached to smaller platforms such as destroyers, cruisers, frigates and submarines.

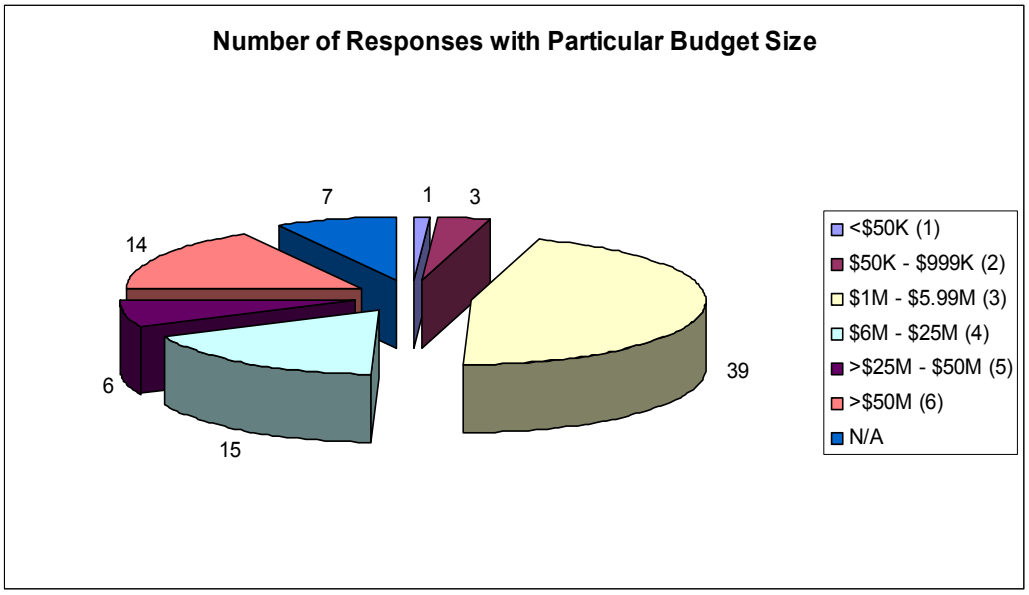

Figure 8. Budget Chart

B. PART II. SUPPLY CHAIN MANAGEMENT

Question 9. Considering the competing demands on your valuable time, where would you rank the importance of tracking your parts/material status as compared to the importance of other tasks in your daily routine?

(*Low*) 1 2 3 4 5 6 7 (*High*)

This question facilitates a comparison between the importance of tracking parts and the budget percentage applied to obtaining logistics information. Most respondents considered tracking parts a legitimate and important concern. Note the curve skewed to the right in Figure 9.

Tracking Parts vs Other Tasks	Frequency	Relative Frequency	Percent Frequency
N/A	1	0.01	1.18
No Answer	4	0.05	4.71
1 Low	-	0.00	0.00
2)	3	0.04	3.53
3)	2	0.02	2.35
4)	8	0.09	9.41
5)	19	0.22	22.35
6)	22	0.26	25.88
7 High	26	0.31	30.59
	85	1.00	100.00

Table 9. Importance of Tracking Parts

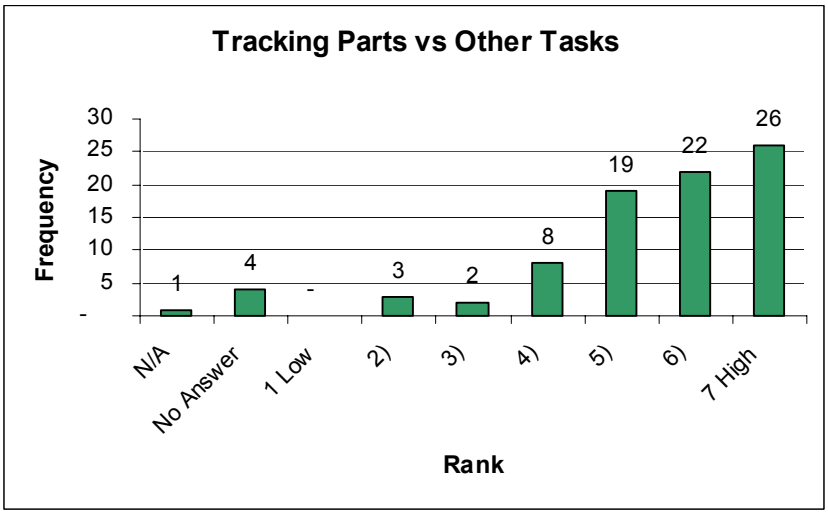

Figure 9. Importance of Tracking Parts Chart

Question 10. Using your best estimate, how much of your daily time is dedicated to tracking parts?

While Deployed: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

Question Ten reinforces and helps to validate the importance of tracking parts and the resources in time and effort a respondent is willing to apply to that endeavor.

Time Used to Track Parts Deployed	Frequency	Relative Frequency	Percent Frequency
N/A	14	0.16	16.47
<1hr	13	0.15	15.29
1 - 2hrs	23	0.27	27.06
2 - 3hrs	12	0.14	14.12
3 - 4hrs	7	0.08	8.24
4 - 6hrs	7	0.08	8.24
6 - 8hrs	3	0.04	3.53
>8hrs	6	0.07	7.06
Sum	85	1.00	100.00
Median	2	1 - 2hrs	
Average	3.07	2 - 3hrs	

Table 10. Time Used to Track Parts Deployed

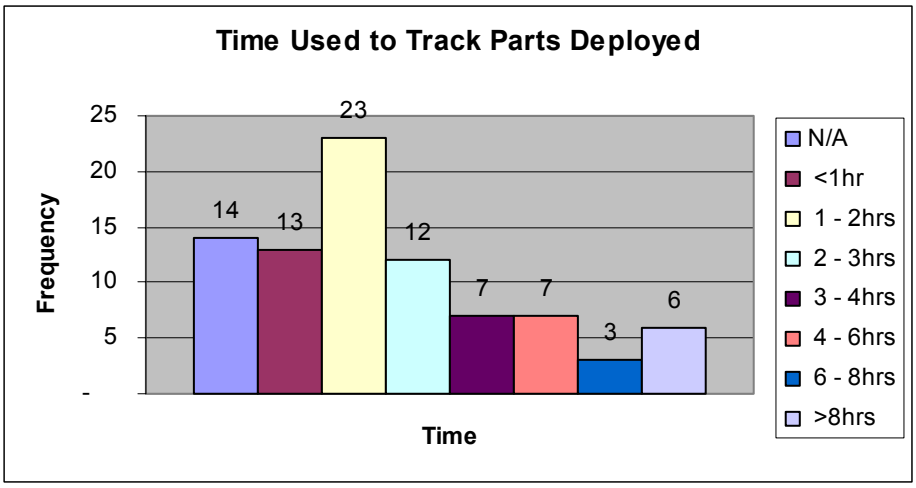

Figure 10. Time Used to Track Parts Deployed

While at Home Base: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

Note the difference between Figures 10 and 11 in time used to track parts while at home base as opposed to being deployed. A lower time dedicated to ensure materials and supplies are onboard while at home is expected. While in homeport a ship is conducting important maintenance evolutions and participating in training evolutions. However, these tasks are overshadowed by the importance of obtaining parts and supplies when the warfighter requires them most, when the ship is deployed, especially when conducting combat operations.

Time Used to Track Parts at Home Base	Frequency	Relative Frequency	Percent Frequency
<1hr	32	0.38	37.65
1 - 2hrs	25	0.29	29.41
2 - 3hrs	15	0.18	17.65
3 - 4hrs	9	0.11	10.59
4 - 6hrs	1	0.01	1.18
6 - 8hrs	2	0.02	2.35
>8hrs	1	0.01	1.18
Sum	85	1.00	100.00
Median	2	1 - 2hrs	
Average	2.2	1 - 2hrs	

Table 11. Time Used to Track Parts at Home Base

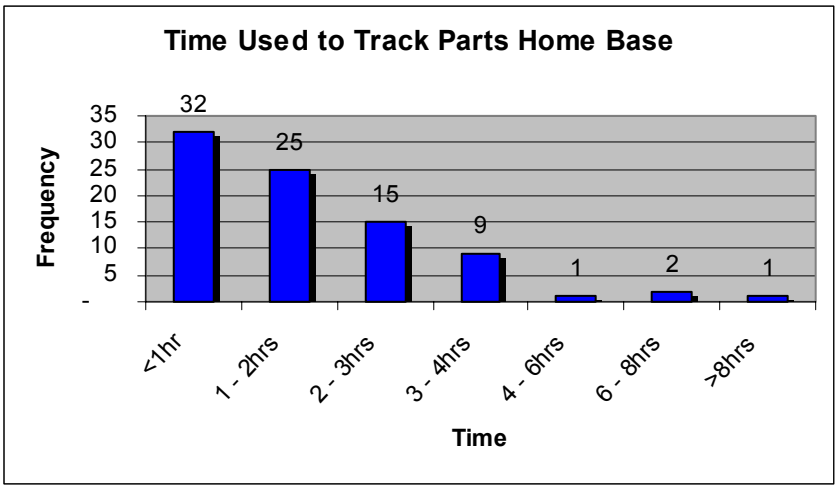

Figure 11. Time Used to Track Parts at Home Base

Question 11. Typically how much of your staff's time is dedicated to tracking parts?

While Deployed: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

The spread in the time used to track parts by staff is similar to that of the supply officer when deployed and operating in the vicinity of home base. The obvious difference between Questions 10 and 11 is the total time spent. In the task of tracking and expediting parts, staff dedicates more time than Supply Officers. This was an expected outcome. The sample used in this study confirms that expectation.

Staff's Time Tracking Parts Deployed	Frequency	Relative Frequency	Percent Frequency
N/A	14	0.16	16.47
<1hr	3	0.04	3.53
1 - 2hrs	4	0.05	4.71
2 - 3hrs	15	0.18	17.65
3 - 4hrs	11	0.13	12.94
4 - 6hrs	12	0.14	14.12
6 - 8hrs	3	0.04	3.53
>8hrs	23	0.27	27.06
Sum	85	1.00	100.00
Median	5	4 - 6hrs	
Average	4.77	3 - 4hrs	

Table 12. Staff's time used to track parts while deployed

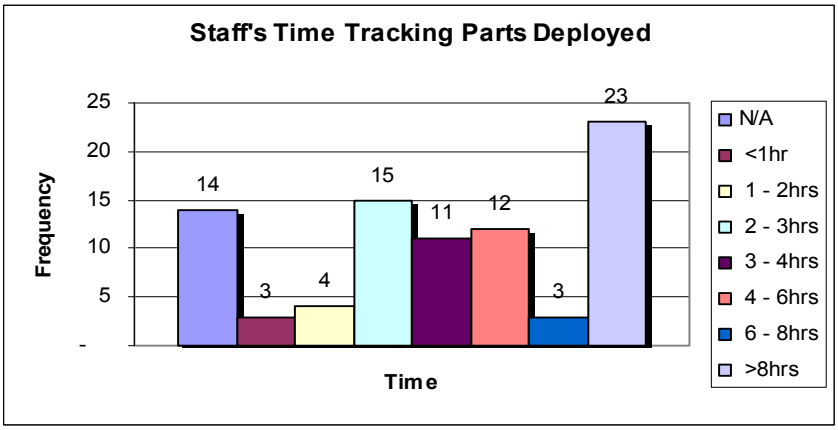

Figure 12. Staff's time used to track parts while deployed

While at Home Base: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

Staff's Time Tracking Parts Home Base	Frequency	Relative Frequency	Percent Frequency
<1hr	5	0.06	5.88
1 - 2hrs	16	0.19	18.82
2 - 3hrs	18	0.21	21.18
3 - 4hrs	17	0.20	20.00
4 - 6hrs	7	0.08	8.24
6 - 8hrs	13	0.15	15.29
>8hrs	9	0.11	10.59
Sum	85	1.00	100.00
Median	4	3 - 4hrs	
Average	3.94	2 - 3hrs	

Table 13. Staff's time used to track parts while at home base

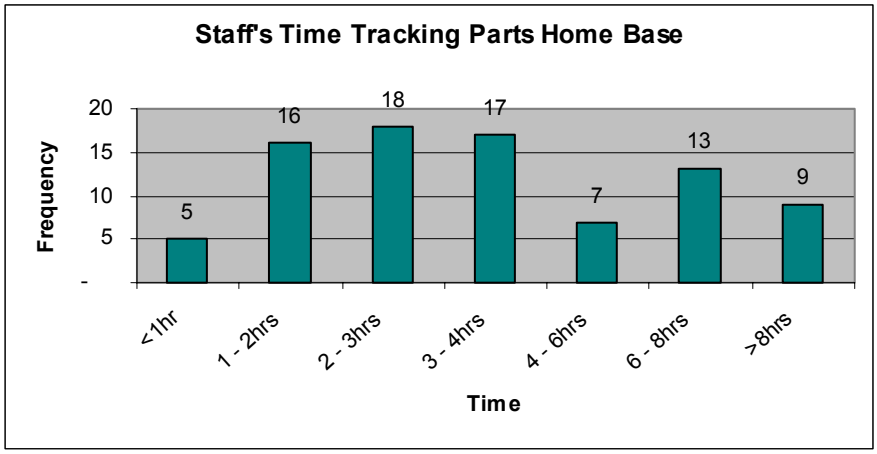

Figure 13. Staff's time used to track parts while at home base

A naval logistician will periodically update his immediate senior on the status of incoming requisitions. The frequency will differ depending on the class of ship to which he or she is attached. On a larger ship the immediate senior is usually another Supply Officer and on a smaller ship the SUPPO will most likely report directly to the Commanding Officer. Depending on the senior, the update may include both high

priority and low priority parts and stock replenishment items. Usually, the immediate senior will concentrate on high priority parts as these parts can affect mission outcome.

Question 12. While **deployed overseas**, how frequently are you required to update your immediate senior on parts status?

N/A Hourly Twice daily Daily Weekly Monthly Other _____

Frequency of Updating Senior Deployed	Frequency	Relative Frequency	Percent Frequency
N/A	18	0.21	21.18
Hourly	1	0.01	1.18
Twice Daily	20	0.24	23.53
Daily	42	0.49	49.41
Weekly	3	0.04	3.53
Monthly	-	0.00	0.00
Other	1	0.01	1.18
	85	1.00	100.00

Table 14. Frequency of Updating Senior Deployed

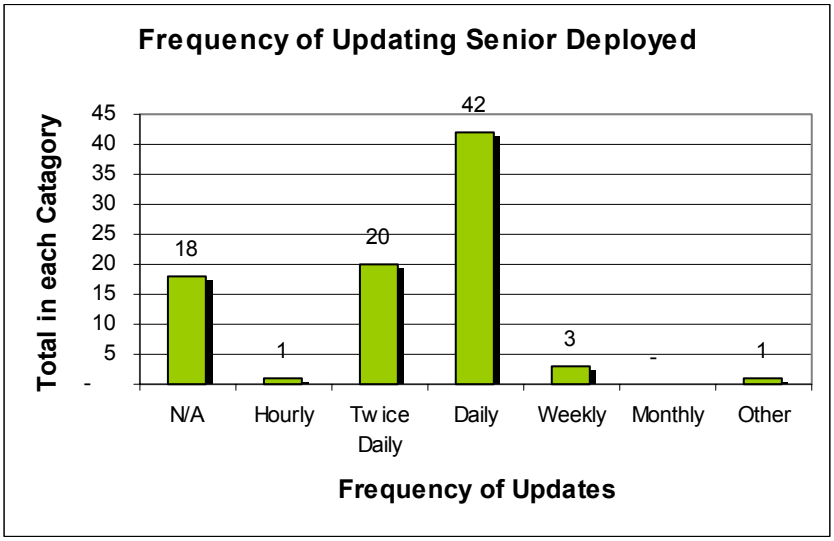

Figure 14. Frequency of Updating Senior Deployed

Question 13. While operating **at home base**, how frequently are you required to update your immediate senior on parts status?

N/A Hourly Twice daily Daily Weekly Monthly Other _____

Frequency of Updating Senior Home Base	Frequency	Relative Frequency	Percent Frequency
N/A	3	0.04	3.53
Hourly	-	0.00	0.00
Twice Daily	2	0.02	2.35
Daily	54	0.64	63.53
Weekly	19	0.22	22.35
Monthly	5	0.06	5.88
Other	2	0.02	2.35
	85	1.00	100.00

Table 15. Frequency of Updating Senior at Home Base

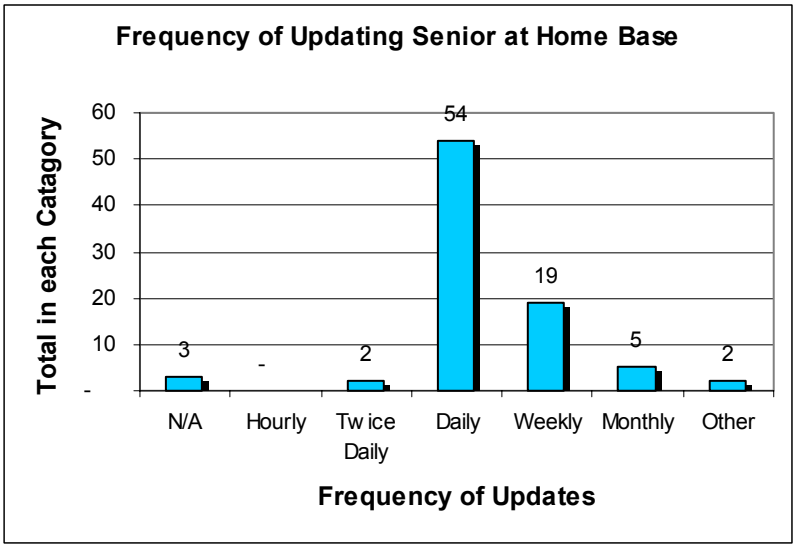

Figure 15. Frequency of Updating Senior at Home Base

Question 14. The information fields below are data commonly requested by logisticians when conducting a status query of ordered parts. Choose five items from the list below with an "X" that, for you, are critical to conducting a successful status query.

Lead TCN ____ Current Location _____ Date Shipped _____

Method of Shipment _____ Est. Shipping Date _____

Est. Delivery Date _____ Originating Location _____

Availability/Lead Time _____ Shipping Route _____

Customs Info _____ Quantity _____ Shelf Life _____

Type Ship. Cont._____

Name of Person w/ Last Possession _____ Other: _____

Question 14 was designed to deliver to those concerned the information fields that are preferred by Supply Officers and other naval logisticians when conducting a status query. They essentially want to know: a) where the part is, b) when it was or is going to be shipped, c) how it was shipped and d) when the part is going to get there. The value of this information is that it helps determine what information should be accessible when a logistics database is established based on RFID technology.

Status Query Logistics Data	Frequency	Relative Frequency	Percent Frequency
Current Location	63	0.1482	14.82
Date Shipped	74	0.1741	17.41
Lead TCN	49	0.1153	11.53
Method of Shipment	59	0.1388	13.88
ESD	40	0.0941	9.41
EDD	55	0.1294	12.94
Originating Location	22	0.0518	5.18
Shipping Route	17	0.0400	4.00
Availability/Lead Time	20	0.0471	4.71
Customs Info	4	0.0094	0.94
Quantity	9	0.0212	2.12
Type Shipping Container	2	0.0047	0.47
Person With Last Possessior	6	0.0141	1.41
Tracking Info	2	0.0047	0.47
Shelf Life	1	0.0024	0.24
Other	1	0.0024	0.24
No Answer	1	0.0024	0.24
	425	1.0000	100.00

Table 16. Commonly Requested Logistics Data Fields

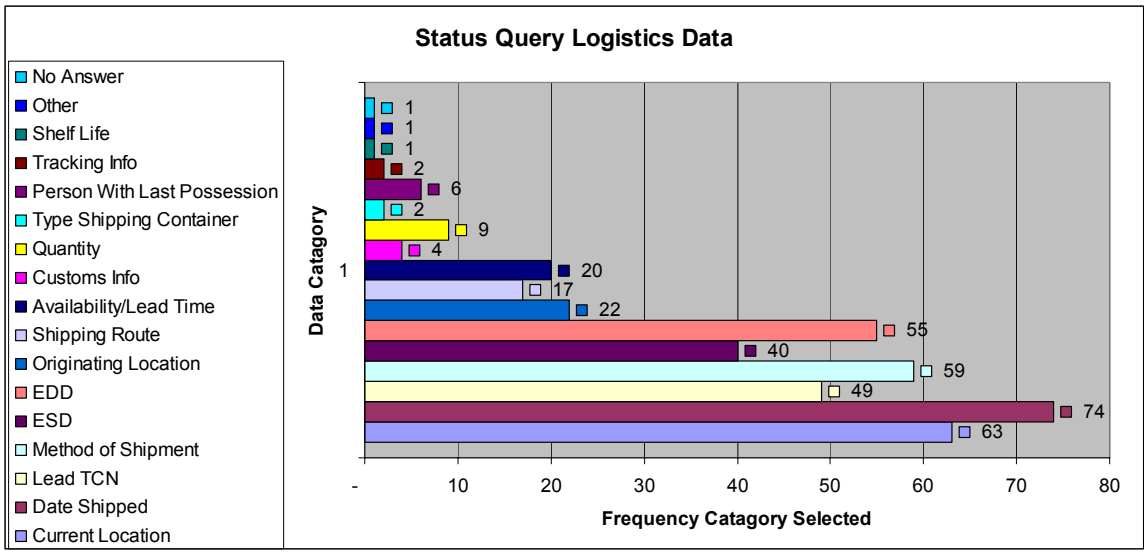

Figure 16. Status Query Logistics Data

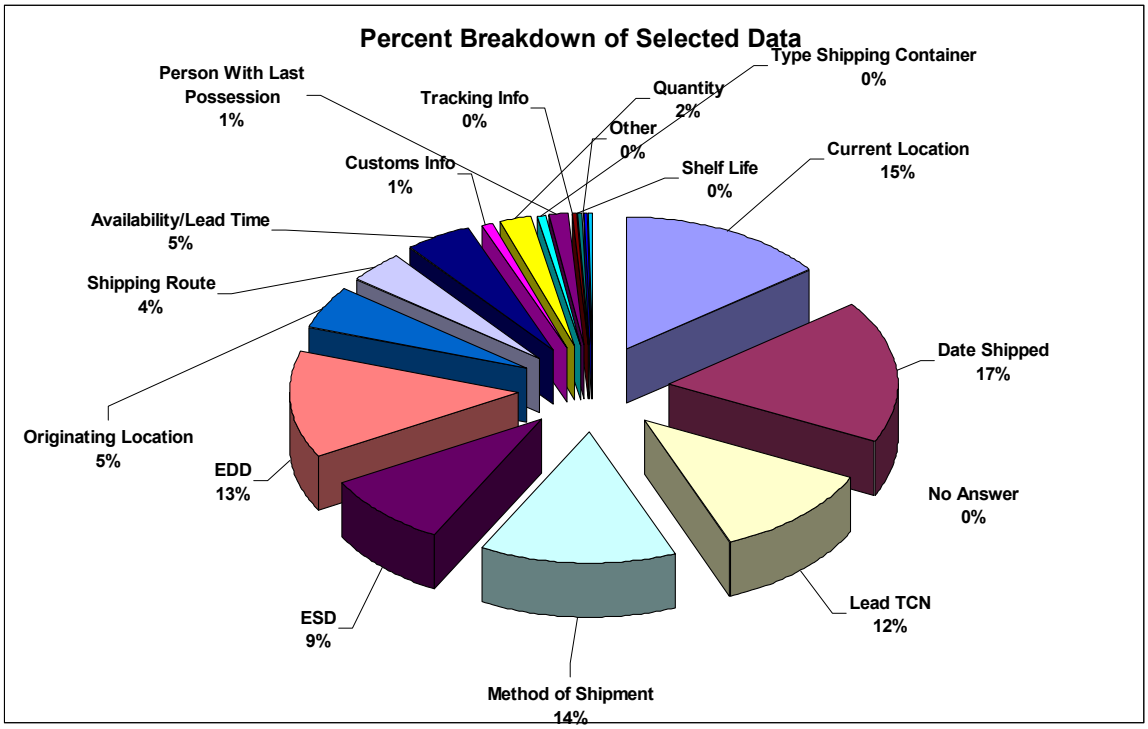

Figure 17. Percent Breakdown of Status Query Logistics Data

**Of the five that you picked, write in the field that you feel is most important in the space provided. _____

Top Field	Frequency	Relative Frequency	Percent Frequency
Availability/Lead Time	4	0.0471	4.71
Current Location	9	0.1059	10.59
Date Shipped	1	0.0118	1.18
Depends	1	0.0118	1.18
EDD	18	0.2118	21.18
ESD	3	0.0353	3.53
Lead TCN	21	0.2471	24.71
Location	1	0.0118	1.18
Method of Shipment	6	0.0706	7.06
Priority	1	0.0118	1.18
Shipping Route	1	0.0118	1.18
Tracking Info	2	0.0235	2.35
No Answer	17	0.2000	20.00
	85	1	100.00

Table 17. Preferred Logistics Data Fields

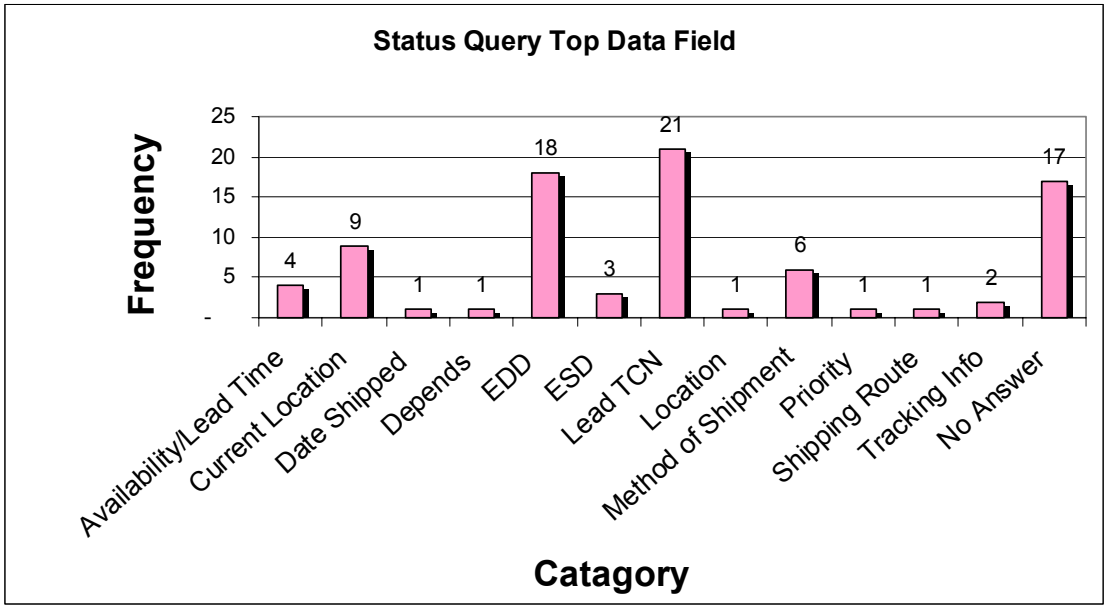

Figure 18. Status query Top Data Fields

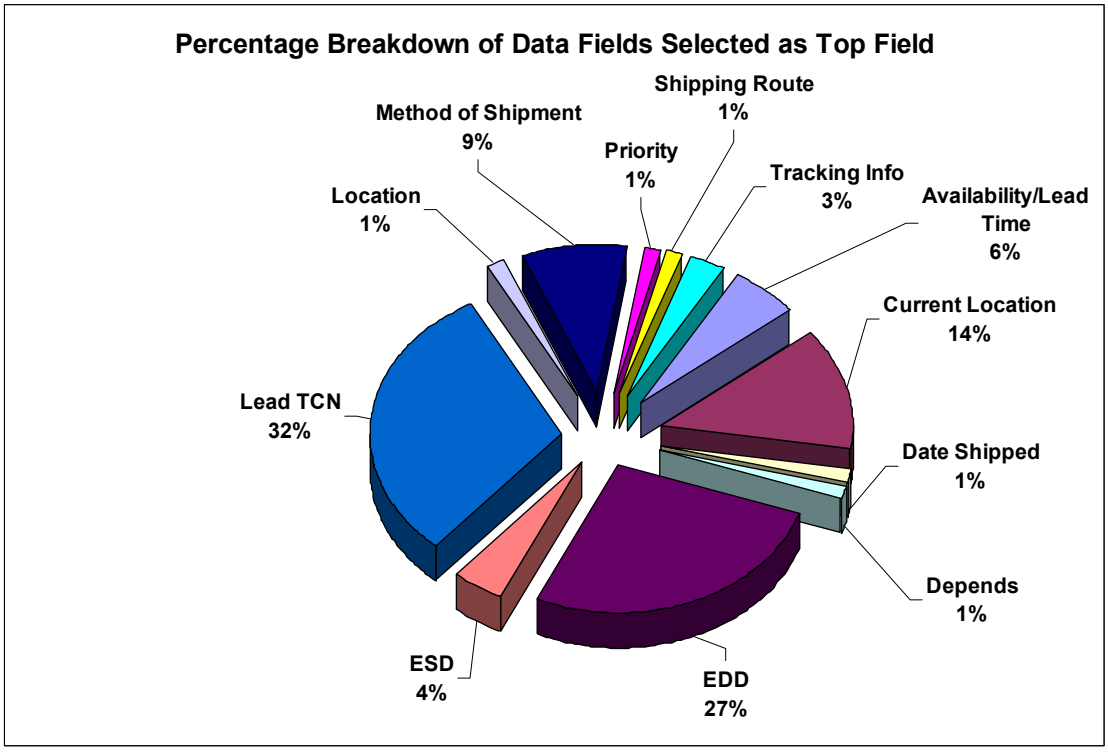

Figure 19. Percentage Breakdown of Status Query Top Data Fields

Unfortunately, due to the placement of this question in the survey, 21 people failed to provide an answer. In Appendix A, the reader can see that this question is tucked underneath the main body of question #14. In hindsight, it's clear that this question deserved its own question number.

The researchers discovered that for those who did answer this question, the Lead Transportation Control Number (TCN) is considered the most important information field. When a part is packed into a container with other parts it can end up "lost." This is exactly the problem that occurred with many containers arriving in the Middle East during Desert Storm and Operation Iraqi Freedom. The containers arrived at the piers and nobody knew what was in them.

This question provides direct support for the advantages of constructing an RFID-based logistics infrastructure. An RFID tag on a container can identify every part in the container without opening the container.

> **Question 15.** Assume a highly advanced parts tracking service is available at a cost not covered by your Immediate Superior In Command. This service can provide real time, global data on the exact location of your parts. Additionally it can provide all the information in question #14 including the five that you selected. This information will allow you to better predict delivery date and will facilitate intervention when there are shipment delays in the supply chain.
>
> What percentage of your annual budget would you be willing to spend to utilize this "new" service if it were available?

Question 15 is the money question, both literally and figuratively. This is the question that tells us how much somebody is willing to pay for the advanced logistics information that RFID technology can provide. Analysis of the percentage in relation to the size of the respondent's budget and other factors or data points discovered in the survey sample is conducted in Chapter V. Observing the responses to Question 15, it is apparent that the percentage of a respondent's budget dedicated to improved logistics information is affected by the priority of the material and whether the command is deployed or not.

While Deployed:

Hi Pri only 0% 1% 2% 3% 5% 7% 10% or >

% of Budget Deployed Hi Pri	Frequency	Relative Frequency	Percent Frequency
0%	12	0.1412	14.12
1%	23	0.2706	27.06
2%	13	0.1529	15.29
3%	6	0.0706	7.06
5%	8	0.0941	9.41
7%	8	0.0941	9.41
10% or >	7	0.0824	8.24
No Answer	8	0.0941	9.41
Sum	85	1.0000	100.00
Median	2%		
Average	3.03%		

Table 18. Percentage of Budget applied to Parts Tracking Service while deployed for Hi Pri Parts

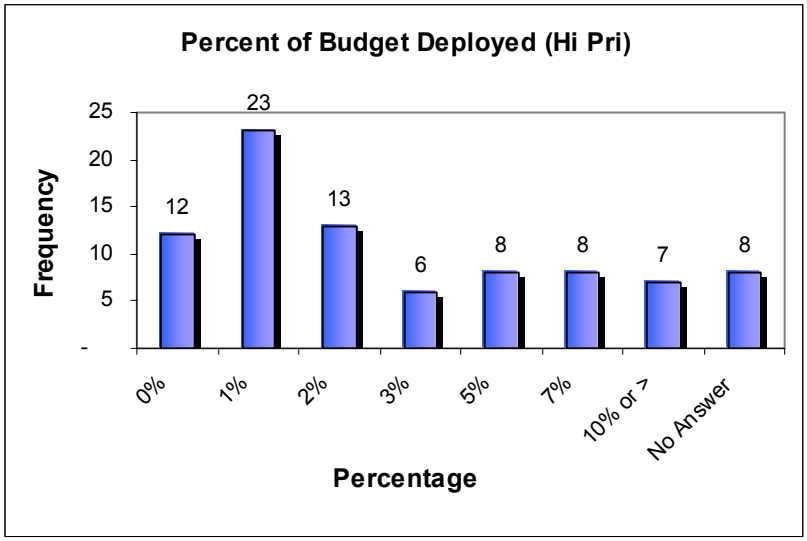

Figure 20. Percentage of Budget applied to Parts Tracking Service while deployed for Hi-Pri Parts

All Parts (Hi and Low Pri) 0% 1% 2% 3% 5% 7% 10% or >

% of Budget Deployed All Parts (Hi and Low)	Frequency	Relative Frequency	Percent Frequency
0%	19	0.2235	22.35
1%	25	0.2941	29.41
2%	9	0.1059	10.59
3%	7	0.0824	8.24
5%	11	0.1294	12.94
7%	3	0.0353	3.53
10% or >	3	0.0353	3.53
No Answer	8	0.0941	9.41
Sum	85	1.0000	100.00
Median	1%		
Average	2.21%		

Table 19. Percentage of Budget applied to Parts Tracking Service while deployed for Hi Pri and Low Pri Parts

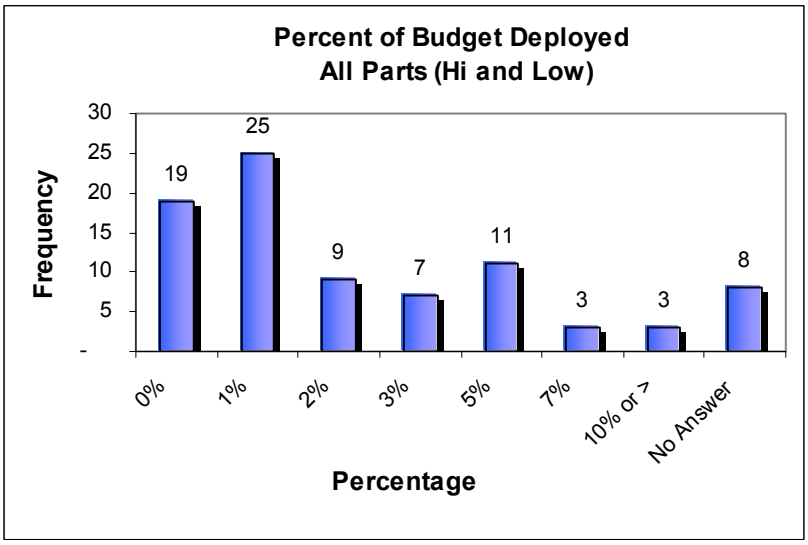

Figure 21. Percentage of Budget applied to Parts Tracking Service while deployed for Hi Pri and Low Pri Parts

While At Home Base:

Hi Pri only 0% 1% 2% 3% 5% 7% 10% or >

% of Budget Home Base (Hi Pri)	Frequency	Relative Frequency	Percent Frequency
0%	24	0.2824	28.24
1%	27	0.3176	31.76
2%	5	0.0588	5.88
3%	11	0.1294	12.94
5%	11	0.1294	12.94
7%	3	0.0353	3.53
10% or >	3	0.0353	3.53
No Answer	1	0.0118	1.18
Sum	85	1.0000	100.00
Median	1%		
Average	2.10%		

Table 20. Percentage of Budget applied to Parts Tracking Service while at Home Base for Hi Pri Parts

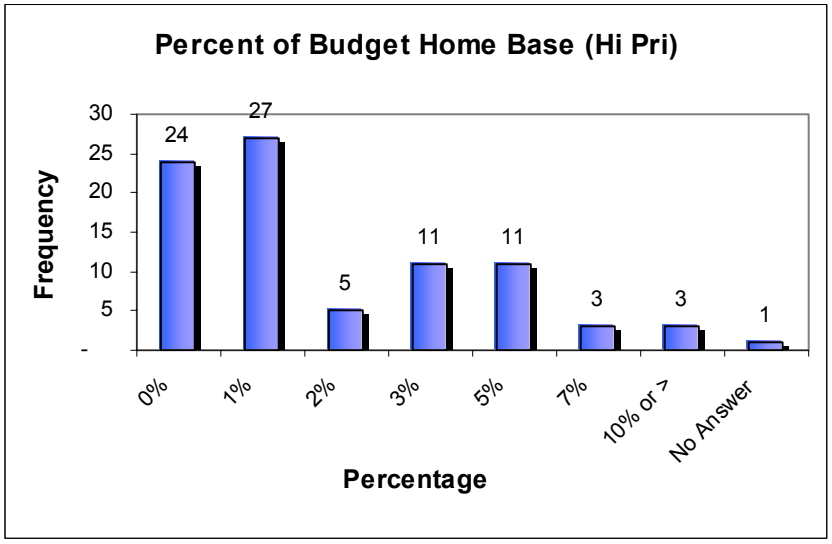

Figure 22. Percentage of Budget applied to Parts Tracking Service while at Home Base for Hi Pri Parts

All Parts (Hi and Low Pri) 0% 1% 2% 3% 5% 7% 10% or >

% of Budget Home Base All Parts (Hi and Low)	Frequency	Relative Frequency	Percent Frequency
0%	32	0.3765	37.65
1%	24	0.2824	28.24
2%	7	0.0824	8.24
3%	9	0.1059	10.59
5%	8	0.0941	9.41
7%	1	0.0118	1.18
10% or >	3	0.0353	3.53
No Answer	1	0.0118	1.18
Sum	85	1.0000	100.00
Median	1%		
Average	1.69%		

Table 21. Percentage of Budget applied to Parts Tracking Service while at Home Base for All Parts (Hi and Low Pri)

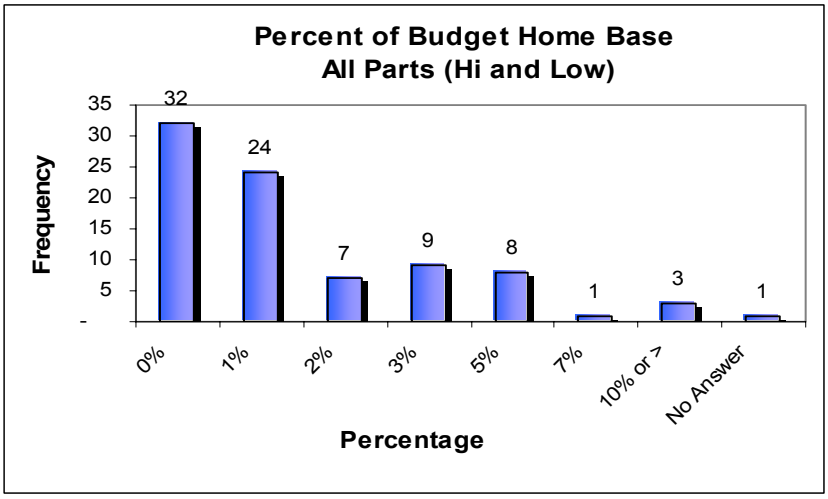

Figure 23. Percentage of Budget applied to Parts Tracking Service while at Home Base for All Parts (Hi and Low Pri)

If you are willing to spend more while deployed, why? Several comments were submitted in response to this question. A few of the more interesting are reviewed in Chapter V.

C. PART III. BACKGROUND INFORMATION ON PARTS TRACKING SERVICES

Question 16. List the top two methods or resources you currently use to track high priority requisitions or purchased materials (e.g., contacting an expeditor, status update messages, SALTS, FedEx Website).

1. _____ 2. _____

Here the researchers are inquiring about resources being used to track parts in the absence of an RFID-based logistics information system.

Parts Tracking Resource	Frequency	Relative Frequency	Percent Frequency
AFLSC/PMO Norva	5	0.0294	2.94
Beach Det Info	2	0.0118	1.18
CMOS	1	0.0059	0.59
DAAS	1	0.0059	0.59
Expeditor	30	0.1765	17.65
FedEx Website	29	0.1706	17.06
FISC-LSR	4	0.0235	2.35
GATES	2	0.0118	1.18
GTN	14	0.0824	8.24
ISIS	11	0.0647	6.47
JTAV	2	0.0118	1.18
One Touch	15	0.0882	8.82
PMO Bremerton	7	0.0412	4.12
SALTS	12	0.0706	7.06
Status Messages	3	0.0176	1.76
Telephone	2	0.0118	1.18
Web Link	1	0.0059	0.59
Website	9	0.0529	5.29
MILSTRIP Status	1	0.0059	0.59
NAVICP IWST	1	0.0059	0.59
DDSC DSS	1	0.0059	0.59
Item Manager	1	0.0059	0.59
Logtool.net	1	0.0059	0.59
NAVICP/DLA Website	1	0.0059	0.59
NAVTRANS Report	1	0.0059	0.59
NSSC	1	0.0059	0.59
OTS	1	0.0059	0.59
R Supply	1	0.0059	0.59
Status Update	1	0.0059	0.59
TYCOM Reports	1	0.0059	0.59
VLIPS	1	0.0059	0.59
Web Based Systems	1	0.0059	0.59
	5	0.0294	2.94
Webcats	1	0.0059	0.59
	170	1.0000	100.00

Table 22. Parts Tracking Resources

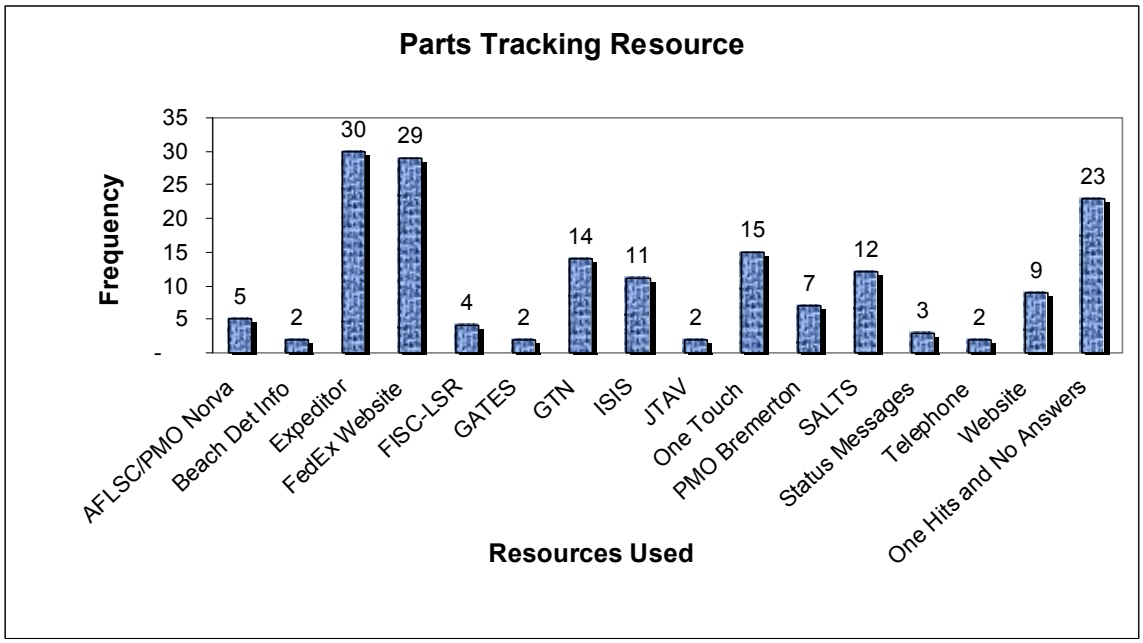

Figure 24. Parts Tracking Resources

Questions 17 and 18, which follow, ask the respondents how they view the effectiveness of parts tracking services provided by the DoD and commercial shipping companies such as FedEx and DHL. These resources are currently used worldwide by those engaged in the daily effort to provide the warfighter the parts and materials they need to prosecute their missions.

These services are effective. Measuring delivery times and calculating loss rates are unnecessary given the scope of this project. Observing the successes in the Global War on Terror verifies that these services are doing what is needed to support the military in executing the war.

However, significant improvements can be made for the purpose of improving real-time access to logistics information. How the respondents to the survey feel about DoD and commercial tracking services are recorded in the following questions. Most notable in the results is the preference for commercial tracking services, which are available when using commercial shipping.

Question 17. How would you rank the current tracking systems used by DOD to track outstanding parts and supplies?

While Deployed: (Poor) 1 2 3 4 5 6 7 (Excellent)

Ranking of Current DOD Tracking Systems Deployed	Frequency	Relative Frequency	Percent Frequency
No Answer	8	0.09	9.41
1 Low	2	0.02	2.35
2)	6	0.07	7.06
3)	10	0.12	11.76
4)	22	0.26	25.88
5)	23	0.27	27.06
6)	11	0.13	12.94
7 High	3	0.04	3.53
	85	1.00	100.00

Table 23. Ranking of Current DoD Tracking System Deployed

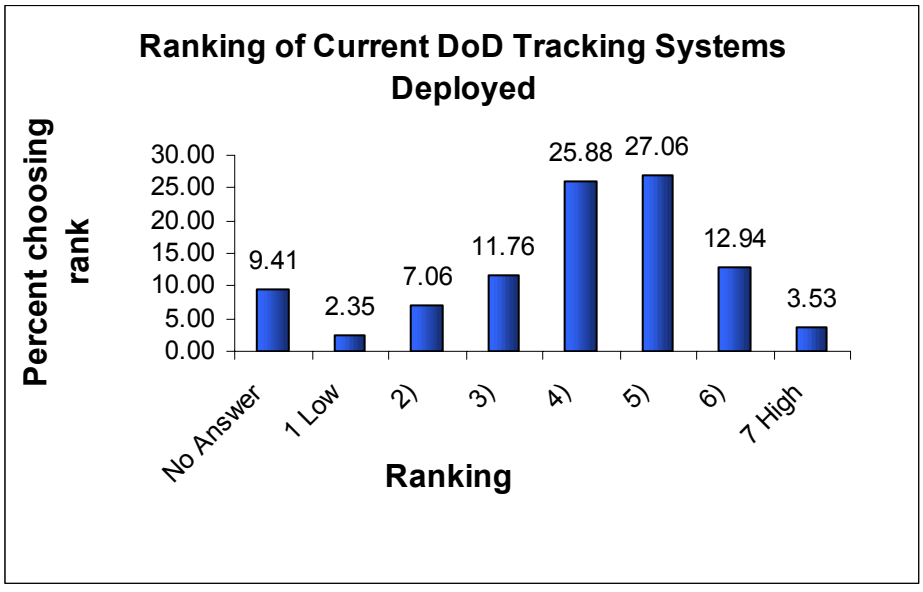

Figure 25. Ranking of Current DoD Tracking Systems Deployed

While at Home Base: (Poor) 1 2 3 4 5 6 7 (Excellent)

Ranking of Current DOD Tracking Systems Home Base	Frequency	Relative Frequency	Percent Frequency
No Answer	1	0.01	1.18
1 Low	1	0.01	1.18
2)	8	0.09	9.41
3)	6	0.07	7.06
4)	17	0.20	20.00
5)	30	0.35	35.29
6)	19	0.22	22.35
7 High	3	0.04	3.53
	85	1.00	100.00

Table 24. Ranking of Current DoD Tracking System at Home Base

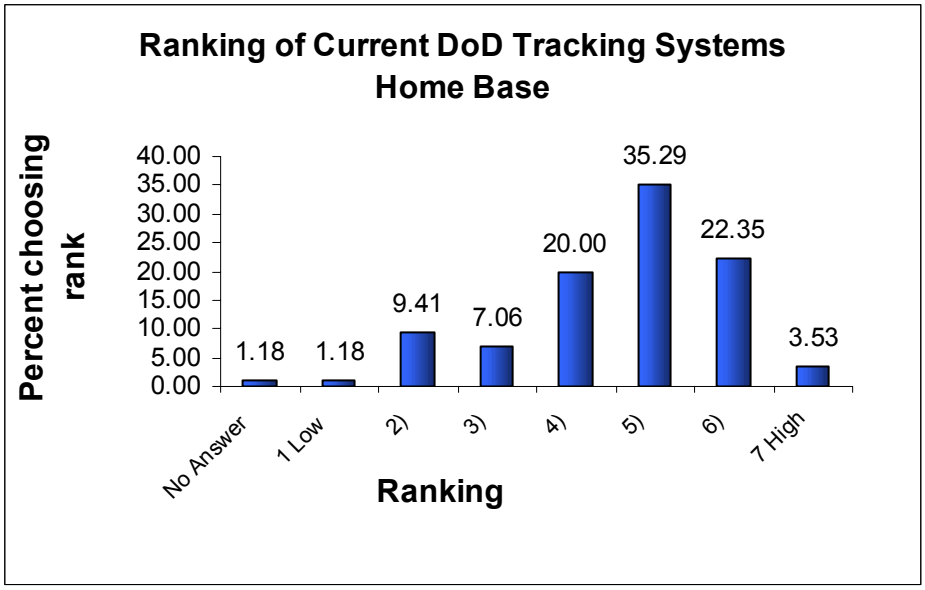

Figure 26. Ranking of Current DoD Tracking Systems at Home Base

Question 18. Based on your experience, how would you rank the tracking systems used by commercial delivery services (such as FedEx and DHL) for DOD material?

While Deployed: (Poor) 1 2 3 4 5 6 7 (Excellent)

Ranking of Commercial Tracking Services Deployed	Frequency	Relative Frequency	Percent Frequency
No Answer	8	0.09	9.41
1 Low	-	0.00	0.00
2)	-	0.00	0.00
3)	3	0.04	3.53
4)	5	0.06	5.88
5)	13	0.15	15.29
6)	34	0.40	40.00
7 High	22	0.26	25.88
	85	1.00	100.00

Table 25. Ranking of Commercial Tracking Services Deployed

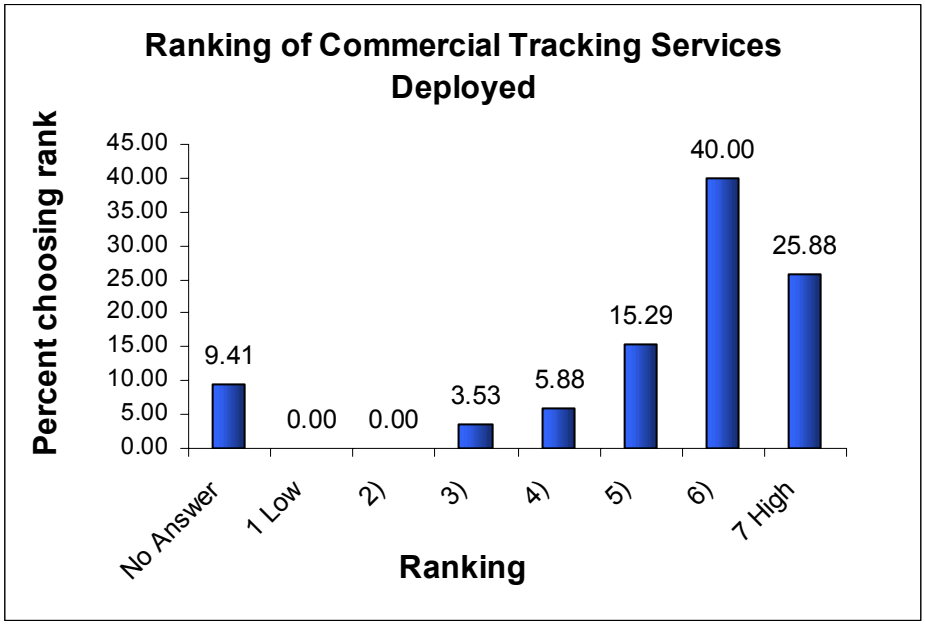

Figure 27. Ranking of Commercial Tracking Services Deployed

While at Home Base: (Poor) 1 2 3 4 5 6 7 (Excellent)

Ranking of Commercial Tracking Services Home Base	Frequency	Relative Frequency	Percent Frequency
No Answer	1	0.01	1.18
1 Low	-	0.00	0.00
2)	-	0.00	0.00
3)	2	0.02	2.35
4)	5	0.06	5.88
5)	15	0.18	17.65
6)	34	0.40	40.00
7 High	28	0.33	32.94
	85	1.00	100.00

Table 26. Ranking of Commercial Tracking Services at Home Base

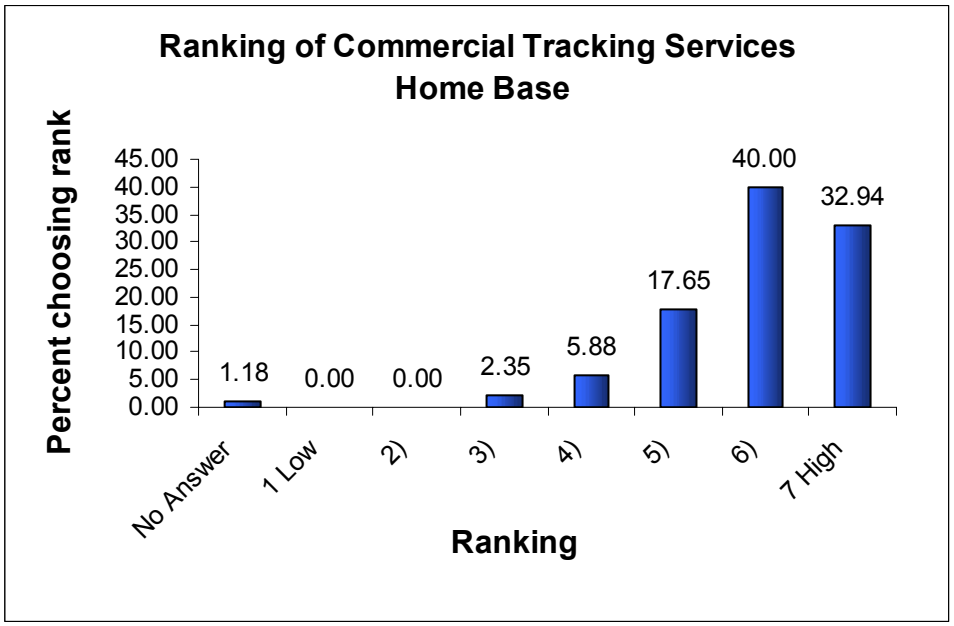

Figure 28. Ranking of Commercial Tracking Services at Home Base

THIS PAGE INTENTIONALLY LEFT BLANK

V. DATA ANALYSIS

A. SURVEY SAYS…

This chapter focuses on how the survey results answer the research questions: 1) "What is comprehensive, accurate and near real time logistics information, provided via Radio Frequency Identification (RFID) technology, worth to the 'man in the foxhole'?" and 2) "What would someone in the foxhole pay to have real time information concerning incoming critical materials and supplies?"

The survey results revealed a common theme: Logistics information is indeed a valuable asset. *How so?* one might ask. If one values something, where is the evidence? Based on the data the researchers presented in Chapter IV, budget dollars and time are the two leading indicators that logistics information not only is valuable, but can also be quantified.

B. IS LOGISTICS INFORMATION VALUABLE?

Yes. Logistics is so important that 56% of the respondents answered with either a 6 or 7 (on a scale of 1 –7, 7 being the highest) on survey question 9. This means that the supply officer ranks logistics information at or near the top of all duties. Why does he rank it so high? It is because his boss requires this information. The median was 6, the mode was 7 and the mean was 5.66. Noteworthy is the fact that the mode, or most often picked, was 7. 78% of the respondents said they ranked the importance at 5 or above and 31% chose 7.

If tracking parts and material is important, it goes without saying that the respondents and their staffs should dedicate a reasonable and corresponding amount of time doing just that. In questions 10 and 11, the survey participants were asked to quantify the amount of time they and their staffs dedicate to tracking parts and materials. They were asked to estimate this for two different situations: in a deployed status and operating at home base. The results are documented in Tables 10 – 13. For simplification an average was calculated for each scenario using the frequency of the midpoint in time multiplied by the number of those who responded to questions 10 and 11.

For the average calculation, refer to Table 10. The frequency times the midpoint of time = x. For example, the midpoint of time for 0-1 hours equals 0.5 hours. Therefore, in the first line of Table 10, a frequency of 13 x 0.5 hours = 6.5. Proceeding to the next line, a frequency of 23 x 1.5 hours = 34.5 hours, and so on. Do this for each line and then sum the answers and divide by 71 (85 respondents – 14 N/As = 71) to arrive at the average.

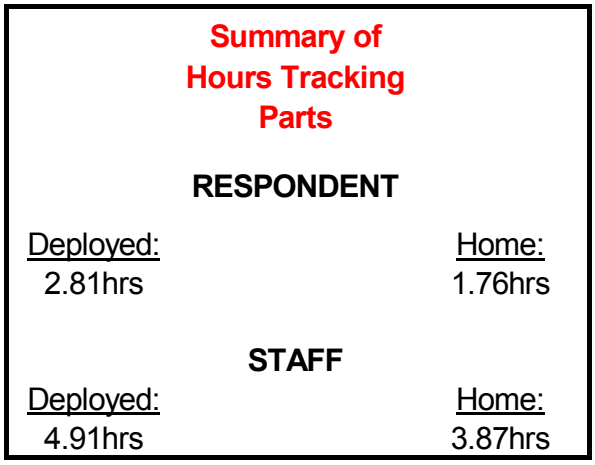

Figure 29. Average Time Spent Tracking Parts

In Figure 29 one can see the difference in time spent between the two groups. This outcome was expected by the researchers. The staff's primary job is tracking parts with minimal other duties as compared to the respondents. While the respondent's primary and most important job is tracking parts (see Figure 9), they do not personally get into the weeds as much as their expert staff. As expected, both spend more time tracking parts when deployed. This is because the warfighter has made logistics the SUPPO's top concern.

The researchers learned from the survey results that a significant amount of time and effort is expended in finding parts status. The fruit of the labor the supply officer and his staff invest is deemed so important that COs want this information as often as twice per day. The reason? Logistics issues feed into the strategic decision making process that directly affects the battle problem.

The SUPPO's senior officer is concerned with mission readiness and combat capability. The command depends on the parts and materials that support preventive and corrective maintenance required to maintain a high level of mission readiness and combat capability. As such, the SUPPO's boss should expect to be briefed on parts status.

The survey responses validate this point. While at home base over 60% of the respondents briefed their senior officer at least daily. Of the 67 respondents that answered this question, 62% brief their senior at least daily when deployed and 30% brief their immediate senior at least *twice* daily on parts status when deployed. 73% of the respondents update their boss either daily or twice daily while deployed.

Two specific data points present in the survey responses imply that logistics data is valuable information. Supply Officers understand that the pursuit of this information is an important part of the workday and, accordingly, they dedicate a significant portion of their own direct time and their staff's time to that pursuit.

If logistics information is not valuable, than why does the CO want to be briefed as much as twice per day? It is because the CO's boss is also anxious for updated logistics information. The Destroyer Squadron commander has five ship captains and each of them is expected to know the latest status of critical casualty reports (CASREP). As discussed previously, the senior officer, usually the Commanding Officer or a senior Supply Officer is a "pull" or "force" on the SUPPO providing direction and guidance that coincides with the command's mission.

C. HOW MUCH ARE THEY WILLING TO SPEND FOR LOGISTICS INFORMATION?

To see if a relationship existed between the capabilities of RFID technology and the ability to improve access and visibility to logistics information, we asked the survey respondents to apply a percentage of their budget in four separate circumstances (see question 15 in Chapter IV).

The responses to survey question 15 answers the question concerning how much would they willingly pay for accurate real time logistics information. The beauty in the combined survey responses is that the respondents revealed how much money they would

sacrifice to have this information. They were perfectly willing to carve money out of their already austere budgets, that is, "take it out of hide".

How many respondents did not want to spend additional money for logistics information? A total of 12 SUPPOs out of 85 (14%) replied that they would not spend any money from their budget on improved logistics information. They cited various reasons such as OPTAR being too precious to use when the DOD already provides an adequate logistics tracking service (See Appendix C).

As noted above, logistics information is valuable, but how much is one willing to spend for it? In the words of Richard Dawson, the game show host of *Family Feud*, "survey says"…$856,775!

Data obtained from three aircraft carriers were compared to the results of survey question 15 (see Table 27). $34,828,261 is the mid-point of a carrier's budget range. $856,775 represents the average amount of money that all CVN respondents were willing to spend out of their annual budget for logistics information for high and low priority material while deployed. 2.46% represents the average budget percentage all CVN respondents were willing to spend out of their annual budget for high and low priority material while deployed.

During fiscal year 2003 each carrier ordered an average of 6,330 parts per month or 211 parts per day. Carrier respondents reported they are willing to spend $71,398 per month or $2,380 per day to obtain better logistics information on their parts. As Richard Dawson would say to the $64,000 question, *survey says*…they are willing to spend $11.28 per part ordered. $11.28 is considerably higher than the $0.15 it costs today for an RFID tag that can provide the logistics information they desire.

Command Type	Midpoint of Budget Size Selection	% of Budget Deployed Hi Pri	How Much for Deployed Hi Pri	% of Budget Deployed All Parts (Hi and Low)	How Much for Deployed All Parts	% of Budget Home Base Hi Pri	How Much for Home Base Hi Pri	% of Budget Home Base All Parts (Hi and Low)	How Much for Home Base All Parts
NAS	$62,500,000	3.00%	$1,875,000	3.00%	$ 1,875,000	3.67%	$ 2,293,750	2.33%	$ 1,456,250
AOE	$ 7,500,000	3.00%	$ 225,000	2.00%	$ 150,000	1.67%	$ 125,250	1.33%	$ 99,750
ASD	$37,500,000		$ -		$ -	10.00%	$ 3,750,000	10.00%	$ 3,750,000
CG	$ 3,500,000	4.00%	$ 140,000	3.75%	$ 131,250	3.00%	$ 105,000	2.50%	$ 87,500
FFG	$ 3,500,000	1.00%	$ 35,000	0.50%	$ 17,500	0.25%	$ 8,750	0.00%	$ -
LCC	$ 3,500,000	1.00%	$ 35,000	1.00%	$ 35,000	1.00%	$ 35,000	1.00%	$ 35,000
LHD	$15,500,000	3.33%	$ 516,150	2.33%	$ 361,150	1.00%	$ 155,000	1.00%	$ 155,000
LPD	$ 3,500,000	0.00%	$ -	0.00%	$ -	0.00%	$ -	0.00%	$ -
LSD	$ 3,500,000	1.25%	$ 43,750	1.50%	$ 52,500	0.75%	$ 26,250	1.25%	$ 43,750
NAV Staff	$15,500,000	10.00%	$1,550,000	5.00%	$ 775,000	5.00%	$ 775,000	0.00%	$ -
NAVSTA	$ 8,508,333	4.40%	$ 374,367	3.20%	$ 272,267	4.43%	$ 376,919	4.00%	$ 340,333
SUB	$ 3,500,000	2.67%	$ 93,450	2.67%	$ 93,450	2.17%	$ 75,950	1.67%	$ 58,450
SUB Squadron	$26,500,000	5.00%	$1,325,000	2.00%	$ 530,000	3.00%	$ 795,000	1.50%	$ 397,500
TYCOM	$ 1,750,000	5.00%	$ 87,500	2.50%	$ 43,750	5.00%	$ 87,500	2.50%	$ 43,750
Type Wing	$62,500,000		$ -		$ -	0.00%	$ -	0.00%	$ -
USPACFLT	$62,500,000		$ -		$ -	1.00%	$ 625,000	1.00%	$ 625,000
CV/CVN	$34,828,261	3.32%	$1,156,298	2.46%	$ 856,775	1.89%	$ 658,254	1.68%	$ 585,115
DDG	$ 4,500,000	2.17%	$ 97,650	1.17%	$ 52,650	0.92%	$ 41,400	0.67%	$ 30,150

Table 27. Avg. Budget and % Allocation to RFID Logistics Info per Command Type

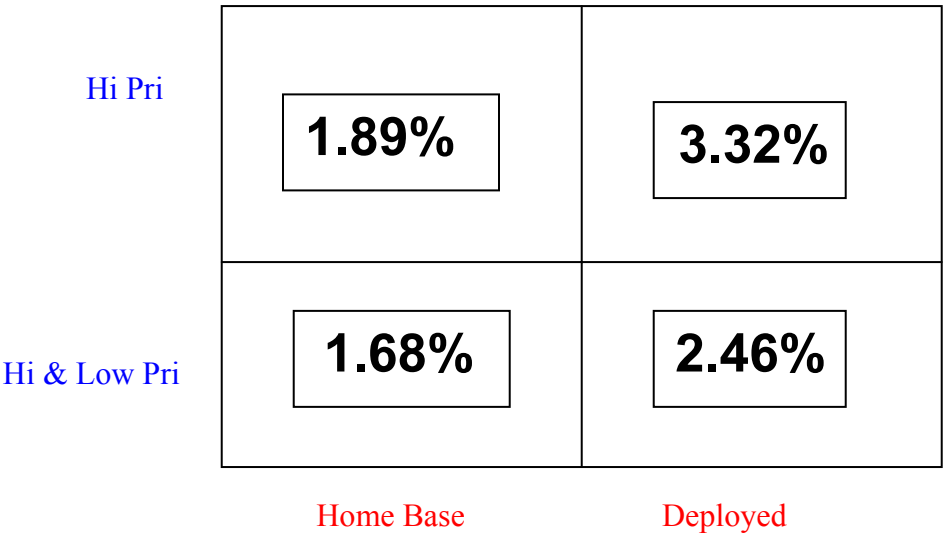

Figure 30. % of CV/CVN Annual Budget Willing to Spend on Logistics Info

For each of the four categories in question 15, an aircraft carrier, on average, is willing to spend a significant sum on logistics information. The percentages in Figure 30 reflect the slice of the carrier's budget to be dedicated for advance logistics information. These figures differ from those in Table 27 due to rounding in the Excel program. One

could reasonably surmise from the results posted in Table 27 that in a hostile environment, for the navy "deployed", logistics information is more valuable.

D. SURVEY COMMENTS

Major Themes. Question 15 in Part III of the survey was the only question that asked the respondents to provide input to justify/clarify their response. Specifically, if the respondent was willing to spend more money on a new and improved parts tracking service while deployed, the researchers wanted to know why.

In the answers to Question 15, one basic idea or theme came through loud and clear as to why more money would be spent on logistics information while deployed. The unanimous reply was "operational commitment." This was not a surprise. For example, when deployed, the navy treats every day like war. The preceding 18 months of the Inter-Deployment Training Cycle (IDTC) train the ship's crew to be battle ready for a six-month deployment--ready to sail into harm's way. A few of the comments read like this: "need to keep the planes flying," "operational readiness is imperative when deployed," "mission essentiality" and so on.

In Part IV of the survey, the respondent was given the opportunity to add any additional comments. As it turns out, they had a lot to say. The survey comments section in Appendix C exceeded 3000 words. Figure 31 below illustrates the top five recurring themes and their frequencies.

Supply chain issues garnered the most activity. Although this is a broad topic, the comments touched on problems in addition to things that worked well. The bottom line from answers in this category is that there is definitely room to improve the supply chain while deployed.

Bandwidth and sharing information tied for second place. Bandwidth included all information concerning technology issues such as the lack of Internet connectivity by deployed ships and the exclusive dependency on web-based logistics tools. This is interesting because RFID will rely on being accessed via the Internet and was viewed by some respondents as "just another logistics tool we won't be able to access." Although bandwidth did not score as many hits as supply chain management, the tone of the comments about the lack of connectivity coupled with the frustration of not being able to

freely access it with any regularity led the researchers to conclude that this is probably the most pressing issue for the warfighter.

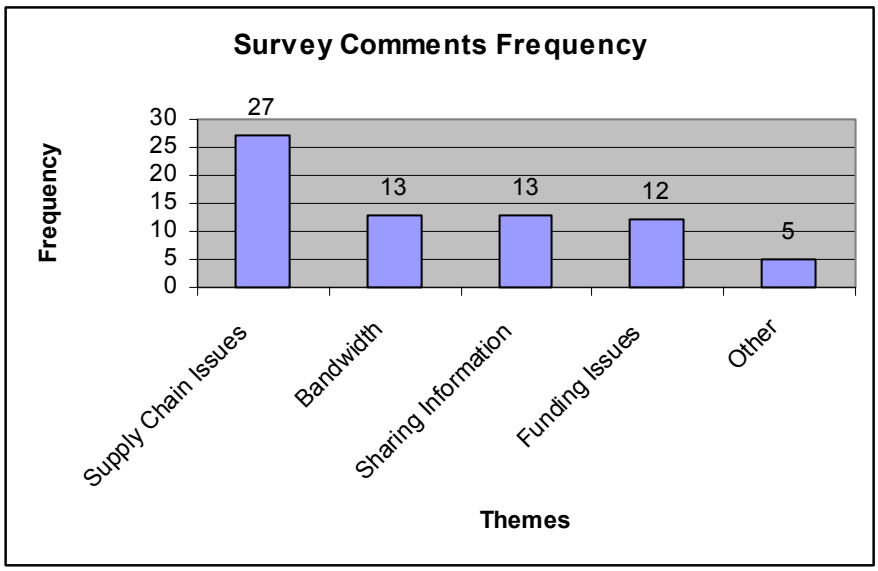

Figure 31 Survey Comment Themes

E. RELEVANCE OF THE DEPARTMENT HEAD

Survey questions 3 and 5 together reveal who is the supply department head and who is not. There is a difference in job scope and accountability between a carrier division officer and a destroyer department head even though the two may be of equal rank. Based on the data gleaned from the survey, reinforced by the researcher's experience, the most important logistician to the warfighter is his supply department head--SUPPO. There is a big difference in rank between a submarine department head (junior Ensign) and a carrier department head (senior commander). But these two hold the same title of SUPPO and department head and they are the captain's "go-to man".

The survey responses show that the Supply Officer who is a department head is more willing to spend a portion of his budget on RFID-supported logistics information than Supply Officers who are not department heads. The size of the budget portion dedicated to logistics depends on the amount of material that is brought aboard, which is reflected by budget size. Additionally, the higher the volume of material, the more likely is the SUPPO to be engaged in tracking and expediting.

The researchers ran a multiple regression to see if their is a correlation between the SUPPOs in Department Head positions and the percentage of their budgets they would apply in each category listed in question 15 of the survey. The SUPPO/Department Heads were identified by the size of their budget. This was selected as the "y" or dependent variable. The independent variables were the following: Do they track parts, are they a Supply Officer, the % of their budget deployed (Hi Pri), the budget figure for deployed (Hi Pri) and the remaining three categories in question 15 concerning budget percentage and the budget figure for each category.

The multiple regression resulted in an R square of 0.718. This tells us that the bigger a budget a department head manages, the more resources he will dedicate to obtaining real-time accurate logistics information. The regression statistics are listed in Table 28.

SUMMARY OUTPUT

Regression Statistics	
Multiple R	0.847638111
R Square	0.718490367
Adjusted R Square	0.624653822
Standard Error	12120405.1
Observations	41

Table 28. Multiple Regression: SUPPO's to Budget

The supply department head is the one who answers directly to the CO and therefore not only has a vested interest in having the best available logistics information, but also is most willing to do whatever is necessary to provide the best information to the top consumer of that information—the CO. The department head is accountable solely to the CO and thus, his judgment to spend money for enhanced logistics information carries significant weight.

F. HIDDEN COSTS

This section addresses large deck supply officers (aircraft carriers and amphibious assault ships) that do not feel it is necessary to spend additional money to obtain better logistics information. The key point is that logistics information has value. Anything

worth having is worth paying for. Therefore, do the large deck supply officers realize that they are already paying a hefty and self-imposed price to obtain better logistics information?

Survey respondents reported that logistics information was already provided by their handpicked staff who were placed ashore during deployment to track their parts status. Therefore, these respondents were not interested in an enhanced tracking service, yet they were willing to sacrifice seven personnel for this endeavor.

The seven personnel sent ashore are called the "beach det" which is short for beach detachment. Beach dets usually consist of five sailors, one Chief, and one officer. Leaving personnel on shore to track parts is common practice for large decks in order to better support the large volume of material requisitions they generate during a deployment. The biggest priority is critical aviation parts.

The costs involved in this undertaking are salary, cost of accommodations (hotel, cell phones, laptops, airline tickets, per diem, rental trucks/cars), and the lost source of labor onboard the ship. The slack created from this lost labor pool has to be made up by the remaining personnel onboard. Additionally, the beach det deploys two weeks in advance of the ship's actual departure date from the U.S.

According to Naval Personnel data, the average annual compensation (salary and benefits) for an enlisted service member is $55,000 and $110,000 for an officer. To move these people off the ship for a six month deployment costs $220,000. To fund their beach det operation costs an additional $115,600 for six months. This is $16,514 per person. The total bill comes to $335,600 for a beach det, or $266.35 per day per person.

And what does the ship receive in return? Better information? Faster, more reliable parts delivery service? Does this make sense? RFID infrastructure certainly has start up costs, but can it be provided for less than the large deck's example? The carriers and amphibs could save the entire $335,600 by eliminating the beach det concept and letting the shore establishment and tools like RFID work for them as designed.

Since carriers are willing to pay $11.28 per requisition, can RFID technology beat this price? Using $856,775/2 ($428,387) that a carrier is willing to spend for advanced

logistics capabilities during a six month deployment plus the $335,600 they spend on their beach det during a deployment--the answer is yes! The carriers are willing to pay $92,787 more for the improved logistics information. Does any of this matter? No, improved logistics information does not cost $11.28 per requisition; it costs $0.15 per requisition--the price of an RFID tag.

The reduction in labor involved in tracking parts and conducting inventories, near elimination of lost parts, and fewer parts consumed due to uncertainty have yet to be calculated. The cost savings from these activities is an area for further research. One can reasonably assume that these savings will be large.

VI. CONCLUSION

The benefits in deploying an integrated RFID system Navy-wide can be measured tangibly by the measurable cost savings inherent in providing accurate real-time logistics information. Those savings immediately identifiable are reduced labor and reduced parts consumption. Intangible benefits result from access to better information. Improved decision-making resulting from better information reduces waste in resources and time allocation.

The value of logistics information is evidenced by the fact that not only are we currently paying for logistics information but also we are willing to invest additional resources for additional information. If it is worth having, it is worth paying for. The figures represented in Table 27 indicate the average amount warfighters, represented by Navy Supply Officers, are willing to pay for improved parts status. A final value per item or requisition can be determined from these figures. This tells us what the added value is to deploying RFID per requisition.

Three conclusions resulting from this research are as follows:

1. Logistics information is valuable and the value is quantifiable. SUPPOs are willing to commit additional resources for an incremental gain in benefits from enhanced logistics information.

2. The peer group of supply department heads are willing to assign resources to provide optimal support to the warfighter. This shows that the actions of the decision makers in the supply department are closely aligned to the warfighters priorities.

3. Bandwidth availability while underway is a top fleet concern. Reliable connectivity for logisticians to consistently access the myriad of web-based tools available to support the warfighter is no longer a "nice to have," it is a "must have" and is key to the successful implementation of an RFID based logistics system.

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX A. SURVEY

RFID Survey

NAVAL POSTGRADUATE SCHOOL

April 6, 2004

Dear Sir/Ma'am,

Students attending the Naval Postgraduate School, Monterey, CA developed this survey. The purpose of this survey is to provide supporting information for our MBA research project (thesis).

Data retrieved from your response will contribute to the outcome of inquiries into the value of implementing Radio Frequency Identification (RFID) technology for use in the Department of Defense logistics pipeline. RFID is a wireless barcode. This technology is currently used by some parts of DOD and private industry to provide real-time information concerning the status of material as it travels through the supply chain.

We have taken steps to make this an anonymous survey. We promise you that any identifying information revealed through your survey responses or email will be not be revealed to anyone.

We sincerely thank you, in advance, for taking the time to complete this survey.

T.J. HUGHES
VADM, USN (Ret)

C. J. CORRIGAN
LCDR, SC, USN

J. E. KIELAR
LT, SC, USN

N. DEW, Ph.D.
Professor

D. R. HENDERSON, Ph.D.
Professor

*As you complete the survey, please **do not** provide your name or other personal identifying information. Your help in providing an **ANONYMOUS SURVEY** will greatly assist research efforts at Naval Postgraduate School. Please reply via email to jekielar@nps.navy.mil. Remember to save your changes to the attachment!* ***THANK YOU!***

(Please circle, mark with an "X" or fill in your response as appropriate. If your selection is "other", please write in your response in the space provided.)

Part I. Preliminary Data

1. Are you? USA USN USMC USAF USCG Other _____

2. Are you? Line officer (war fighter) Staff corps (staff support) Other _____

3. Describe your command, e.g., (sub, frigate, carrier, division, battalion, squadron.) _____

4. Is this command permanently stationed overseas? Yes / No

5. What is your job position or title? _____

6. Do you track parts and/or requisition status? Yes / No

7. Do you manage or directly influence a budget? Yes / No

8. What is the size of the total annual budget you manage?

< $50K $50K – $999K $1M - $5.99M $6M – $25M >$25 - $50M >$50M

Part II. Supply Chain Management

9. Considering the competing demands on your valuable time, where would you rank the importance of tracking your parts/material status as compared to the importance of other tasks in your daily routine?

(*Low*) 1 2 3 4 5 6 7 (*High*)

10. Using your best estimate, how much of your daily time is dedicated to tracking parts?

While Deployed: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

While at Home Base: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

11. Typically how much of your staff's time is dedicated to tracking parts?

While Deployed: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

While at Home Base: <1hr 1 - 2hrs 2 - 3hrs 3 - 4hrs 4 – 6hrs 6 - 8hrs >8hrs

12. While **deployed overseas**, how frequently are you required to update your immediate senior on parts status?

N/A Hourly Twice daily Daily Weekly Monthly Other _____

13. While operating **at home base**, how frequently are you required to update your immediate senior on parts status?

N/A Hourly Twice daily Daily Weekly Monthly Other _____

14. The information fields below are data commonly requested by logisticians when conducting a status query of ordered parts. Choose five items from the list below with an "X" that , for you, are critical to conducting a successful status query.

Lead TCN _____ Current Location _____ Date Shipped _____

Method of Shipment _____ Est. Shipping Date _____ Est. Delivery Date _____

Originating Location _____ Availability/Lead Time _____ Shipping Route _____

Customs Info _____ Quantity _____ Shelf Life _____

Type Shipping Container _____ Name of Person With Last Possession _____ Other: _____

******Of the five that you picked, write in the field that you feel is most important in the space provided.

_____

15. Assume a highly advanced parts tracking service is available at a cost not covered by your Immediate Superior In Command. This service can provide real time, global data on the exact location of your parts. Additionally it can provide all the information in question #14 including the five that you selected. This information will allow you to better predict delivery date and will facilitate intervention when there are shipment delays in the supply chain.

What percentage of your annual budget would you be willing to spend to utilize this "new" service if it were available?

WHILE DEPLOYED:

Hi Pri only	0%	1%	2%	3%	5%	7%	10% or >
All Parts (Hi and Low Pri)	0%	1%	2%	3%	5%	7%	10% or >

WHILE AT HOME BASE:

Hi Pri only	0%	1%	2%	3%	5%	7%	10% or >
All Parts (Hi and Low Pri)	0%	1%	2%	3%	5%	7%	10% or >

If you are willing to spend more deployed, why?

Part III. Background Information on Parts Tracking Services

16. List the top two methods or resources you currently use to track high priority requisitions or purchased materials (e.g., contacting an expeditor, status update messages, SALTS, FedEx Website).

1. _____ 2. _____

17. How would you rank the current tracking systems used by DOD to track outstanding parts and supplies?

While Deployed: (Poor) 1 2 3 4 5 6 7 (Excellent)

While at Home Base: (Poor) 1 2 3 4 5 6 7 (Excellent)

18. Based on your experience, how would you rank the tracking systems used by commercial delivery services (such as FedEx and DHL) for DOD material?

While Deployed: (Poor) 1 2 3 4 5 6 7 (Excellent)

While at Home Base: (Poor) 1 2 3 4 5 6 7 (Excellent)

Part IV. Any Additional Comments:

Thank you!

THIS PAGE INTENTIONALLY LEFT BLANK

APPENDIX B. SOURCE DATA SPREADSHEETS

PART I

Survey #	Branch of Service	Community	Command Type	Overseas Command?	Job Title	Track Parts and Status?	Manage or Influence a Budget?	Size of Annual Budget
1	2	2	CV/CVN	2	Aviation Support	1	1	5
2	2	2	CV/CVN	2	AVDLR Officer	1	1	5
3	2	2	CV/CVN	1	Hazmat Officer	1	2	N/A
4	2	2	CV/CVN	1	Stock Control	1	1	6
5	2	3	FFG	2	Stores LCPO	1	1	3
6	2	2	CV/CVN	2	Stock Control	1	1	4
7	2	2	FFG	2	SUPPO	1	1	3
8	2	2	CV/CVN	2	Aviation Support	1	1	6
9	2	3	CV/CVN	2	Supply LCPO	1	2	N/A
10	2	2	Air Station	2	SUPPO	1	1	6
11	2	2	CV/CVN	2	Stock Control	1	1	4
12	2	2	CV/CVN	2	ASUPPO	1	2	N/A
13	2	2	CV/CVN	2	ASUPPO	2	2	N/A
14	2	2	CV/CVN	2	ASUPPO	2	2	N/A
15	2	2	CV/CVN	2	SERVO	2	1	3
16	2	2	Air Station	2	SUPPO	1	1	6
17	2	2	CV/CVN	2	Hazmat Officer	1	1	1
18	2	3	CV/CVN	2	S-6 LCPO	1	1	6
19	2	2	LPD	2	SUPPO	1	1	3
20	2	2	CV/CVN	2	Stock Control	1	1	5
21	2	2	CG	2	SUPPO	1	1	3
22	2	2	CV/CVN	2	ASUPPO	2	1	6
23	2	2	CV/CVN	2	SUPPO	2	1	6
24	2	2	LHD	2	SUPPO	1	1	4
25	2	2	CV/CVN	2	SERVO	1	1	4
26	2	2	CV/CVN	1	SUPPO	1	1	6
27	2	2	USPACFLT	1	Deputy of Log.	1	1	6
28	2	2	CV/CVN	2	Aviation Support	1	1	6
29	2	3	CV/CVN	2	CPO	1	1	5
30	2	2	DDG	2	SUPPO	1	1	3
31	2	2	LSD	2	SUPPO	1	1	3
32	2	2	CG	2	SUPPO	1	1	3
33	2	2	AOE	2	DIVO	1	1	4
34	2	2	LSD	2	SUPPO	1	1	3
35	2	2	FFG	2	SUPPO	1	1	3
36	2	2	DDG	2	SUPPO	1	1	4
37	2	2	LHD	2	SUPPO	1	1	4
38	2	2	DDG	2	SUPPO	1	1	3
39	2	3	DDG	2	Supply LCPO	1	1	3
40	2	2	FFG	2	SUPPO	1	1	3
41	2	2	LSD	2	SUPPO	1	1	3
42	2	2	CG	2	SUPPO	1	1	3
43	2	2	DDG	2	SUPPO	1	1	3
44	2	2	DDG	2	SUPPO	1	1	3
45	2	2	CV/CVN	2	SUPPO	1	1	2
46	2	2	CV/CVN	2	AVDLR Officer	1	1	6
47	2	2	CV/CVN	2	ASUPPO	1	1	4
48	2	2	TYCOM	1	ILS Officer	1	2	N/A
49	2	2	SUB	1	SUPPO	1	1	3
50	2	2	TYCOM	1	AS/IMA Support	1	1	3

Survey #	Branch of Service	Community	Command Type	Overseas Command?	Job Title	Track Parts and Status?	Manage or Influence a Budget?	Size of Annual Budget
51	2	2	DDG	2	SUPPO	1	1	3
52	2	2	CG	2	SUPPO	1	1	3
53	2	2	NAS	2	SUPPO	1	1	6
54	2	2	AOE	2	SUPPO	1	1	3
55	2	2	ASD	2	ASD Officer	1	1	5
56	2	2	CV/CVN	2	S-8 DIVO	1	2	3
57	2	2	CV/CVN	2	PAL	1	1	6
58	2	2	CV/CVN	2	SERVO	1	1	3
59	2	2	NAV Staff	2	Staff	2	1	4
60	2	2	SUB Squadron	1	SUPPO	1	1	4
61	2	2	SUB	1	SUPPO	1	1	3
62	2	2	SUB	2	SUPPO	1	1	3
63	2	2	SUB	1	SUPPO	1	1	3
64	2	2	SUB	1	SUPPO	1	1	3
65	2	2	SUB	1	SUPPO	1	1	3
66	2	2	SUB Squadron	1	SUPPO	1	1	5
67	2	2	SUB	2	SUPPO	1	1	3
68	2	2	AOE	2	Stores Officer	1	1	3
69	2	3	DDG	2	S-1 LCPO	1	1	3
70	2	2	DDG	2	SUPPO	1	1	3
71	2	3	DDG	2	Leading SK	1	1	3
72	2	3	DDG	2	SUPPO	1	1	3
73	2	2	CV/CVN	2	PAL	1	1	4
74	2	2	LCC	2	SUPPO	1	1	3
75	2	2	LHD	2	Stock Control	1	1	4
76	2	2	NAVSTA	1	SUPPO	1	1	4
77	2	2	NAVSTA	1	SUP OPS	1	1	2
78	2	3	NAVSTA	1	CPO	1	2	N/A
79	2	3	NAVSTA	1	Supply LCPO	1	1	4
80	2	2	NAVSTA	1	Air Logistics Officer	1	1	2
81	2	2	NAVSTA	1	ASUPPO	1	1	3
82	2	2	NAVSTA	1	Aviation Support	1	1	4
83	1	2	LSD	2	SUPPO	1	1	3
84	2	2	DDG	2	SUPPO	1	1	3
85	2	2	Type Wing	2	PAL	1	1	6

PART II

Survey #	Tracking Parts vs Other Tasks	Time Used to Track Parts Deployed	Time Used to Track Parts at Home Base	Staff's Time Tracking Parts Deployed	Staff's Time Tracking Parts Home Base	Frequency of Updating Senior Deployed	Frequency of Updating Senior Home Base
1	7	6	4	7	6	Twice Daily	Daily
2	7	5	3	7	5	N/A	Weekly
3	6	3	2	4	2	Weekly	Weekly
4	6	7	5	7	6	Twice Daily	Daily
5	4	2	2	3	4	Daily	Daily
6	5	2	1	4	3	Daily	Daily
7	6	4	3	5	4	Daily	Daily
8	7	7	2	7	4	Daily	Monthly
9	4	4	2	4	3	Daily	Weekly
10	6	2	2	7	7	Twice Daily	Weekly
11	4	4	2	5	3	Daily	Daily
12	5	2	2	7	6	Daily	Weekly
13	2	1	1	7	5	Daily	Daily
14	N/A	1	1	7	6	N/A	N/A
15	6	4	3	4	4	Daily	Weekly
16	6	4	1	4	6	N/A	Monthly
17	5	2	3	3	3	N/A	N/A
18	7	4	4	5	4	Daily	Daily
19	5	3	2	3	2	Daily	Daily
20	7	3	2	7	4	Hourly	Twice Daily
21	7	3	3	5	5	Daily	Weekly
22	7	2	1	7	6	Twice Daily	Daily
23	5	2	1	6	2	Daily	N/A
24	6	1	1	4	4	Daily	Weekly
25	6	1	1	2	2	Daily	Daily
26		7	6	7	7	Twice Daily	Daily
27	7	3	3	3	3	N/A	Weekly
28	6	5	2	4	2	Twice Daily	Monthly
29	7	7	4	7	4	Twice Daily	Daily
30	5	1	1	3	2	Daily	Daily
31	7	5	3	5	3	Daily	Daily
32	5	1	1	3	2	Daily	Daily
33	4	2	1	3	2	Daily	Daily
34	6	2	1	7	7	Daily	Daily
35	6	2	1	2	1	Twice Daily	Weekly
36	7	7	7	7	7	Daily	Daily
37		3	1	6	3	N/A	Daily
38	7	2	1	5	3	Daily	Daily
39	5	2	2	3	3	Daily	Daily
40	7	3	2	3	2	Daily	Weekly
41	6	3	2	7	6	Daily	Daily
42	7	1	1	3	2	Daily	Daily
43	7	5	3	7	6	Twice Daily	Daily
44	5	3	2	5	6	Daily	Daily
45	7	2	2	7	5	Daily	Weekly
46	7	7	6	7	6	Twice Daily	Daily
47	2	1	1	7	4	Daily	Daily
48	4	N/A	1	N/A	1	N/A	Daily
49	7	N/A	4	N/A	4	Daily	Daily
50	6	5	3	5	3	Daily	Weekly

Survey #	Tracking Parts vs Other Tasks	Time Used to Track Parts Deployed	Time Used to Track Parts at Home Base	Staff's Time Tracking Parts Deployed	Staff's Time Tracking Parts Home Base	Frequency of Updating Senior Deployed	Frequency of Updating Senior Home Base
51	6	2	1	3	2	Twice Daily	Daily
52	6	5	3	6	4	Twice Daily	Daily
53	3	N/A	1	N/A	6	N/A	Weekly
54		1	1	3	3	N/A	Daily
55	7	N/A	4	N/A	6	N/A	Daily
56	5	3	1	1	1	Twice Daily	Daily
57	6	1	1	7	2	Twice Daily	Weekly
58	2	1	1	1	1	Daily	Daily
59	6	2	1	2	1	Daily	Daily
60	5	N/A	2	N/A	2	N/A	Daily
61	5	N/A	1	N/A	2	N/A	Weekly
62	5	2	2	4	4	Daily	Daily
63	6	2	4	3	5	Weekly	Weekly
64		1	2	1	3	Daily	Daily
65	5	1	2	2	3	Daily	Daily
66	4	N/A	1	N/A	2	N/A	Daily
67	5	2	3	3	5	Daily	Daily
68	5	2	1	5	4	Daily	Daily
69	7	4	4	4	5	Daily	Daily
70	5	2	1	3	2	Daily	Daily
71	5	5	3	5	3	Twice Daily	Daily
72	7	6	4	7	6	Twice Daily	Twice Daily
73	7	6	4	7	7	Twice Daily	Weekly
74	5	2	1	5	4	Twice Daily	Daily
75	6	3	2	5	3	Twice Daily	Daily
76	6	N/A	2	N/A	7	N/A	Monthly
77	7	2	2	7	7	Weekly	Weekly
78	6	N/A	3	N/A	3	N/A	Other
79	7	N/A	1	N/A	4	Daily	Daily
80	7	N/A	3	N/A	4	Other	Other
81	3	N/A	1	N/A	8	N/A	Monthly
82	6	N/A	3	N/A	7	N/A	Daily
83	4	2	2	4	3	Daily	Daily
84	7	3	2	4	3	Twice Daily	Daily
85	4	N/A	2	N/A	4	N/A	Daily

Survey #	Info Field One	Info Field Two	Info Field Three	Info Field Four	Info Field Five	Top Field
1	Lead TCN	Date Shipped	Method of Shipment	EDD	Originating Location	Method of Shipment
2	Lead TCN	Current Location	Date Shipped	ESD	EDD	EDD
3	Current Location	Date Shipped	EDD	Shipping Route	Quantity	
4	Lead TCN	Current Location	Date Shipped	EDD	Shipping Route	Lead TCN
5	Lead TCN	Date Shipped	ESD	Method of Shipment	Person With Last Possession	ESD
6	Current Location	Date Shipped	EDD	Quantity	Person With Last Possession	Current Location
7	Method of Shipment	Date Shipped	ESD	Quantity	Shelf Life	
8	Lead TCN	Current Location	Date Shipped	Method of Shipment	Originating Location	
9	Lead TCN	Date Shipped	Method of Shipment	Originating Location	Other	Lead TCN
10	Current Location	Date Shipped	Method of Shipment	ESD	EDD	EDD
11	Lead TCN	Method of Shipment	ESD	EDD	Tracking Info	Tracking Info
12	Date Shipped	Method of Shipment	ESD	EDD	Person With Last Possession	EDD
13	Lead TCN	Current Location	Date Shipped	Method of Shipment	Originating Location	Method of Shipment
14	Current Location	Date Shipped	Method of Shipment	EDD	Originating Location	EDD
15	Current Location	Date Shipped	Method of Shipment	Originating Location	Availability/Lead Time	Depends
16	Current Location	Method of Shipment	EDD	Shipping Route	Quantity	Location
17	Date Shipped	Method of Shipment	EDD	Originating Location	Shipping Route	
18	Lead TCN	Date Shipped	Method of Shipment	Type Shipping Container	Person With Last Possession	Lead TCN
19	Lead TCN	Date Shipped	Method of Shipment	EDD	Shipping Route	Lead TCN
20	Current Location	Method of Shipment	ESD	EDD	Availability/Lead Time	Availability/Lead Time
21	Lead TCN	Current Location	Date Shipped	EDD	Originating Location	Lead TCN
22	Lead TCN	Current Location	Date Shipped	Method of Shipment	Originating Location	Lead TCN
23	Lead TCN	Current Location	Date Shipped	ESD	EDD	Lead TCN
24	Current Location	Date Shipped	Method of Shipment	ESD	Shipping Route	
25	Current Location	Date Shipped	EDD	Originating Location	Availability/Lead Time	
26	Lead TCN	Current Location	Date Shipped	Method of Shipment	ESD	Current Location
27	Current Location	ESD	EDD	Availabilty/Lead Time	Shipping Route	
28	Lead TCN	Current Location	Date Shipped	Method of Shipment	Shipping Route	Current Location
29	Current Location	Date Shipped	Method of Shipment	Originating Location	Quantity	Current Location
30	Lead TCN	Date Shipped	Method of Shipment	EDD	Availability/Lead Time	Method of Shipment
31	Current Location	Date Shipped	Method of Shipment	EDD	Availability/Lead Time	EDD
32	Lead TCN	Current Location	Method of Shipment	ESD	Shipping Route	Current Location
33	Current Location	Date Shipped	Method of Shipment	ESD	Originating Location	Current Location
34	Lead TCN	Method of Shipment	ESD	Originating Location	Availability/Lead Time	ESD
35	Lead TCN	Current Location	Date Shipped	EDD	Originating Location	EDD
36	Lead TCN	Current Location	Date Shipped	ESD	EDD	EDD
37	Current Location	Date Shipped	Method of Shipment	ESD	EDD	
38	Current Location	Date Shipped	Method of Shipment	ESD	EDD	ESD
39	Lead TCN	Current Location	Date Shipped	Method of Shipment	ESD	Method of Shipment
40	Lead TCN	Current Location	Date Shipped	Method of Shipment	Availability/Lead Time	Lead TCN
41	Lead TCN	Current Location	Date Shipped	ESD	EDD	EDD
42	Lead TCN	Date Shipped	Method of Shipment	ESD	Originating Location	Date Shipped
43	Lead TCN	Current Location	Date Shipped	Method of Shipment	Shipping Route	Lead TCN
44	Current Location	ESD	EDD	Availabilty/Lead Time	Person With Last Possession	
45	Lead TCN	ESD	Shipping Route	Customs Info		Lead TCN
46	Lead TCN	Current Location	Date Shipped	Method of Shipment	Person With Last Possession	Method of Shipment
47	Date Shipped	Method of Shipment	ESD	EDD	Availability/Lead Time	
48	Lead TCN	Current Location	Date Shipped	ESD	EDD	EDD
49	Lead TCN	Current Location	Date Shipped	EDD	Shipping Route	
50	Lead TCN	Method of Shipment	ESD	EDD	Shipping Route	Lead TCN

Survey #	Info Field One	Info Field Two	Info Field Three	Info Field Four	Info Field Five	Top Field
51	Current Location	Date Shipped	Method of Shipment	Originating Location	Tracking Info	Tracking Info
52	Lead TCN	Date Shipped	Method of Shipment	ESD	EDD	Lead TCN
53	Current Location	Date Shipped	Originating Location	Availabilty/Lead Time	Date Shipped	EDD
54	Lead TCN	Current Location	Date Shipped	Method of Shipment	EDD	
55	Current Location	Date Shipped	EDD	Availabilty/Lead Time	Quantity	Availability/Lead Time
56	Date Shipped	Method of Shipment	ESD	EDD	Availability/Lead Time	Shipping Route
57	Lead TCN	Date Shipped	Method of Shipment	Availabilty/Lead Time	Quantity	
58	Current Location	Date Shipped	ESD	EDD	Availability/Lead Time	EDD
59	Current Location	Date Shipped	Method of Shipment	ESD	EDD	EDD
60	Current Location	Date Shipped	Method of Shipment	EDD	Shipping Route	
61	Current Location	Date Shipped	ESD	EDD	Quantity	
62	Lead TCN	Current Location	Date Shipped	Method of Shipment	EDD	
63	Current Location	Method of Shipment	ESD	EDD	Originating Location	Method of Shipment
64	Lead TCN	Current Location	Date Shipped	EDD	Availability/Lead Time	EDD
65	Lead TCN	Current Location	Date Shipped	EDD	Shipping Route	Lead TCN
66	Lead TCN	Current Location	Method of Shipment	ESD	EDD	EDD
67	Lead TCN	Current Location	Date Shipped	Method of Shipment	EDD	EDD
68	Current Location	Date Shipped	Method of Shipment	ESD	Availability/Lead Time	Availability/Lead Time
69	Lead TCN	Date Shipped	EDD	EDD	Originating Location	Lead TCN
70	Current Location	Date Shipped	Method of Shipment	ESD	EDD	Current Location
71	Current Location	Date Shipped	Method of Shipment	ESD	EDD	EDD
72	Lead TCN	Current Location	Date Shipped	ESD	EDD	Lead TCN
73	Current Location	Date Shipped	ESD	EDD	Availability/Lead Time	Current Location
74	Current Location	Date Shipped	Method of Shipment	ESD	EDD	EDD
75	Current Location	Method of Shipment	ESD	EDD	Originating Location	EDD
76	Lead TCN	Date Shipped	Method of Shipment	Shipping Route	Customs Info	Lead TCN
77	Lead TCN	Date Shipped	Method of Shipment	Customs Info	Type Shipping Container	Lead TCN
78	Lead TCN	Current Location	Date Shipped	Method of Shipment	Customs Info	Priority
79	Lead TCN	Current Location	Date Shipped	Method of Shipment	EDD	Lead TCN
80	Lead TCN	Current Location	Date Shipped	Originating Location	Quantity	Lead TCN
81	Lead TCN	Current Location	Date Shipped	Method of Shipment	EDD	Lead TCN
82	Lead TCN	Current Location	Date Shipped	Method of Shipment	Originating Location	Lead TCN
83	Date Shipped	Method of Shipment	ESD	EDD	Availability/Lead Time	
84	Lead TCN	Current Location	Date Shipped	Availabilty/Lead Time	Shipping Route	Availability/Lead Time
85	Lead TCN	Current Location	Date Shipped	Method of Shipment	EDD	Current Location

Survey #	% of Budget Deployed Hi Pri	% of Budget Deployed All Parts (Hi and Low)	% of Budget Home Base Hi Pri	% of Budget Home Base All Parts (Hi and Low)
1	1%	1%	1%	1%
2	1%	1%	1%	1%
3	10%	7%	7%	5%
4	1%	1%	1%	1%
5	0%	0%	0%	0%
6	5%	5%	3%	3%
7	2%	1%	0%	0%
8	2%	2%	1%	1%
9	5%	2%	3%	1%
10	5%	5%	5%	5%
11	10%	5%	5%	5%
12	2%	2%	1%	1%
13	5%	1%	2%	1%
14	5%	1%	3%	0%
15	2%	2%	1%	1%
16	1%	1%	1%	1%
17	3%	1%	1%	1%
18	10%	5%	7%	5%
19	0%	0%	0%	0%
20	1%	1%	0%	0%
21	7%	10%	5%	5%
22	1%	1%	1%	1%
23	0%	0%	0%	0%
24	1%	1%	1%	1%
25	2%	2%	1%	1%
26	1%	1%	0%	0%
27			1%	1%
28	7%	5%	1%	1%
29	10%	10%	5%	5%
30	1%	0%	1%	0%
31	0%	0%	0%	0%
32	7%	3%	5%	3%
33	7%	5%	3%	3%
34	1%	1%	0%	0%
35	2%	1%	1%	0%
36	0%	0%	0%	0%
37	7%	3%	1%	0%
38	1%	1%	0%	0%
39	1%	0%	1%	0%
40	0%	0%	0%	0%
41	3%	5%	3%	5%
42	1%	1%	1%	1%
43	10%	5%	5%	3%
44	0%	0%	0%	0%
45	2%	1%	2%	1%
46	0%	0%	0%	0%
47	1%	1%	1%	1%
48	0%	0%	0%	0%
49				
50	10%	5%	10%	5%

Survey #	% of Budget Deployed Hi Pri	% of Budget Deployed All Parts (Hi and Low)	% of Budget Home Base Hi Pri	% of Budget Home Base All Parts (Hi and Low)
51	1%	0%	0%	0%
52	1%	1%	1%	1%
53			5%	1%
54	1%	1%	1%	1%
55			10%	10%
56	0%	0%	0%	0%
57	1%	1%	0%	0%
58	0%	0%	0%	0%
59	10%	5%	5%	0%
60	5%	2%	5%	2%
61	1%	0%	1%	0%
62	2%	2%	5%	2%
63	7%	7%	3%	3%
64	3%	3%	3%	3%
65	1%	1%	0%	0%
66			1%	1%
67	2%	3%	1%	2%
68	1%	0%	1%	0%
69	0%	0%	0%	0%
70	2%	0%	0%	0%
71	5%	1%	2%	3%
72	3%	5%	2%	2%
73	5%	10%	5%	10%
74	1%	1%	1%	1%
75	2%	3%	1%	2%
76			3%	2%
77	7%	7%	7%	7%
78	7%	1%	3%	1%
79	3%	3%	3%	3%
80			10%	10%
81	3%	3%	3%	3%
82	2%	2%	2%	2%
83	1%	0%	0%	0%
84	2%	2%	0%	0%
85			0%	0%

PART III

Survey #	Parts Tracking Resource One	Parts Tracking Resource Two	Ranking of Current DOD Tracking Systems Deployed	Ranking of Current DOD Tracking Systems Home Base	Ranking of Commercial Tracking Services Deployed	Ranking of Commercial Tracking Services Home Base
1	Internet	Expeditor	4	5	7	7
2	Web Link	Fed Ex Website	4	4	5	5
3	JTAV	FISC-LSR	5	4	6	5
4	JTAV	Expeditor	5	5	6	6
5	ISIS PMO Bremerton	One Touch	7	7	7	7
6	One Touch	R Supply	4	5	6	6
7	One Touch	Fed Ex Website	6	6	7	6
8	Expeditor	Email/Phone	1	1	7	7
9	Expeditor	Status Update	4	2	4	4
10	Expeditor	NAVICP/DLA Website	3	4	5	6
11	Fedex	GTN	5	5	7	7
12			5	5	4	4
13	SALTS	Expeditor	3	2	4	5
14	CNAP Expeditor	Web Based Syts	5	6	5	6
15	Expeditor	Internet	4	4	6	6
16	Web Sites	Expeditor	5	5	6	6
17	Fedex	FISC-LSR	6	6	7	7
18	Expeditor	Fed Ex Website	5	6	7	5
19	Status Messages	SALTS	3	5	4	5
20	Expeditor/IM	One Touch	6	6	6	6
21	ISIS	DDSC DSS	5	5	7	7
22	GTN	Fed Ex Website	5	5	7	7
23	Beach Dets	GTN	6	5	6	6
24	Telephone	Internet	6	6	6	6
25	Fedex/DHL	Expeditor	6	6	6	6
26	Web Sites	Expeditor	2	2	3	3
27	DAAS	TYCOM Reports	4	4	6	6
28	Expeditor	Fed Ex Website	4	4	6	6
29	Fed Ex Website	GTN	4	6	6	6
30	Web Sites	Expeditor	4	4	5	5
31	SALTS	ISIS	6	6	7	7
32	AFLSC/PMO Norva	Fed Ex Website	2	2	6	6
33	One Touch	SALTS	4	5	7	7
34	ISIS	Fed Ex Website	5	6	6	7
35	AFLSC/PMO Norva	One Touch	2	2	7	7
36	ISIS	SALTS	4	4	7	7
37	Website	Expeditor	3	4	5	5
38	Status Messages	Expeditor	4	6	5	5
39	FISC LSR	Fed Ex Website	3	3	5	5
40	ISIS	One Touch	4	5	6	6
41	Shipper's Websites	OTS	4	4	5	6
42	One Touch	NAVTRANS Report	6	5	7	7
43	Fedex Website	Expeditor	5	6	7	7
44	GTN	FISC-LSR	3	2	7	7
45	GTN	Fed Ex Website	6	6	6	6
46	One Touch	Fed Ex Website	5	5	6	6
47			3	3	3	3
48	ISIS	One Touch	7	7	7	7
49	PMO	Shipper's Info				
50	PMO ISIS	Fed Ex Website	4	5	7	7

Survey #	Parts Tracking Resource One	Parts Tracking Resource Two	Ranking of Current DOD Tracking Systems Deployed	Ranking of Current DOD Tracking Systems Home Base	Ranking of Commercial Tracking Services Deployed	Ranking of Commercial Tracking Services Home Base
51	AFLSC/PMO Norva	Expeditor	5	5	6	6
52	ISIS	Expeditor	6	5	6	4
53	NAVICP IWST	Fed Ex Website		3		5
54	Expeditor		5	5	6	6
55	One Touch	Webcats		5		7
56	Expeditor	Beach Det Info	5	5	6	6
57	Website	Expeditor	4	6	4	7
58	Fedex Website	SALTS	5	6	7	7
59	Status Messages	SALTS	5	5	6	6
60	Fedex Website	PMO Bremerton		6		6
61	PMO Bremerton	SALTS		4		5
62	PMO Bremerton	Logtool.net	7	7	5	7
63	SALTS	NSSC	4	5	6	7
64	Expeditor	Fed Ex Website	4	4	6	6
65	PMO Bremerton	Fed Ex Website	5	5	6	6
66	PMO Bremerton	Expeditor	5	5	6	6
67	One Touch	VLIPS	4	4	5	6
68	PMO Det Norfolk	Fed Ex Website	6	6	7	7
69	GTN	SALTS	3	3	5	5
70	One Touch	ISIS	5	5	6	7
71	Expeditor	SALTS	1	2	3	4
72	Expeditor	SALTS	4	4	6	6
73	Fedex Website	Expeditor	4	2	7	7
74	ISIS Auto Status	AFLSC/PMO Norva	2	6	6	4
75	Website	Expeditor	5	5	6	7
76	GTN	Websites		3		5
77	CMOS	GTN	5	5	6	6
78	GTN	Shipper's Websites	2	5	6	6
79	Fedex Website	GTN	4	4	5	5
80	GATES	GTN		6		7
81	GTN	GATES	3	4	5	5
82	GTN	Fed Ex Website	5	5	6	6
83	One Touch	Expeditor	2	3	6	6
84	PMO Bremerton	Fed Ex Website	3	5	7	7
85	MILSTRIP Status	Item Manager		4		6

APPENDIX C. SURVEY COMMENTS

Note to reader: The below survey comments were not edited in any way and are presented exactly as they were to the researchers. The only exception is nine surveys with handwritten comments were returned via mail and had to be transcribed.

FORMAT:

I. Survey #___ out of 85 surveys:
II. Survey Part II. Response to question #15: "If you are willing to spend more deployed, why?"
III. Survey Part IV. Any Additional Comments:

I. #6
II. "Due to immediate operational commitments."

I. #7
II. "The supply chain for SouthCom deployers is not yet matured or developed. We depend heavily on the husbanding agents to provide us with the data we need."

I. #8
II.. "Operational readiness is imperative when deployed."

I. #9
II. "LONGER DISTANCE"

I. #10
II. "Deployed budget is significantly higher than home base so I would be spending more. Information while deployed directly impacts operational decisions and is therefore worth more to me. Information while at home base primarily impacts ability to complete training...and then somewhat minimally...and is therefore worth less to me."

I. #11
II. "Turn around time is critical during deployment."

I. #12
II. "Parts must follow me and have a greater potential to be held up somewhere by customs or possibly getting stuck at a USAF base. Parts coming via WWX may be transferred to a local transportation company for some part of the transit, I want to know when the transfer to a different company took place so I can make recommendations if that service is beneficial or not."
III. "WWX is very good, GATES is also a good system if your cargo is moving via AMC."

I. #14

II. “Need to keep the planes flying.”

I. #15
II. “There are more ‘touchable’ support services while in home port.”

I. #18
II. “To expedite the high priority requirements and to improve the Carrier Battle Group Readiness.”
I. #19
II. OPTAR is too precious to use on such a service when an Organic DOD service is available.”
III. “Connectivity consistency and speed is the biggest downfall to material tracking problems. Ships are pushed to utilize Internet based systems to track material, but the connectivity and lack of band width available to the ships do not support them.”

I. #20
II. “Tracking of turn-ins is my major concern. Home base I can pick up and drop off personally, avoiding carcass charges.”
III. “The problems aren’t tracking systems provided to the military. The real problems are the delays at various stops within the logistical pipeline combined with the lack of communication and non-returned messages. The difficult part of this job is trying to get in touch with the person currently responsible for the part/item. Tracking it from one place to another is easy.”

I. #21
II. “Connectivity and visibility are reduced while on deployment. Every available resource helps.”

I. #22
III. “Most people don’t know what is out there to help them. The CRIF is vital. Ensure you put “444” in the required delivery date. This drives all pri-2 material to come individually shipped by WWX. That means each part is traceable. Most chops f—k this up, and there material ends up going to AMC and getting multi-packed. Use the GTN website to track your material (also a learned skill). DLRs are re-ordered 1-for-1 so the stock replenishment will come in pri-2. The CRIF trick will let you expedite your stock, to minimize off-ship requisitions.”

I. #23
II. “Not willing to spend any additional monies. This information is already available to me and my staff. Additionally I have a det of personnel who’s only job is to track my material.”
III. “The military has already invested in a number of tracking systems that were/do provide the information needed to support forward deployed and CONUS units. Program managers need to maintain their drive to complete these programs, instead of partially funding programs and then finding another “new” and improved program to work on.

RFID has been around for almost 2 years, and is better used in commercial programs. DOD will never get this right, until all services act as one DOD."

I. #25
II. "Logistics schedules have higher variability."

I. #26
II. "1- ALWAYS DEPLOYED SO MOOT QUESTION, 2 – AM I ABLE TO LEVERAGE SAVINGS FROM REDUCED MANPOWER TO PAY FOR THIS, 3 – IS IT GOING TO WORK UNDERWAY AND IF SO WHO IS GOING TO PAY FOR THE BANDWIDTH, BECAUSE IT IS NOT HERE NOW...UNLESS YOU'LL DROP IT DOWN VIA GBS."
III. "BANDWIDTH CONSTRAINTS MAKE IT A CHALLENGE AT TIMES...IF BANDWIDTH WAS BETTER (AND/OR LOW BANDWIDTH PAGES) WOULD BE A 5 OR 6.

"Sounds like a great idea...sad thing is that commercial industry has been doing this for some time...so why are we still studying it? Are we willing to invest in the "whole" technology suite to support this including interfacing with various stock management system as well as transportation systems? And this is all the way from DEPOT to end user (the Sailor/Marine turning the wrench on an airfield in the middle of no where). Would also like to know what our friends on the CRYPTO side of the house think about this as afar as providing information to the enemy...enough data makes for classified information. Finally, is this stuff going to be Sailor proof?

I would assume this will be applied to ALL Classes of Supply...if not...we should not be wasting out time/resources."

I. #28
II. "Mission Essentiality. The crux of my material tracking begins when we are underway while flying. Inport, the FEDEX pipeline to our homebase works well."

I. #29
II. "For improved Aircraft Readiness...to get our mission accomplished."
III. "Any electronic tracking implemented for tracking where the urgent materials is currently located and any anticipated delays to receiving the end product will definitely improved customer service and provide improved aircraft readiness."

I. #31
II. "Ship budgets should not be used because we get so very little $$$ anyway. The program should be sponsored by N4 or J4 for logistics and readiness."

I. #33
II. "Because the transportation pipeline is so much longer deployed it compounds the visibility when something gets lost (takes longer to get replacement items). Also ships, don't have access to direct mailing addresses like they do in their homeports. FEDEX and other similar type carrier can't ship to a FPO address."

I. #34
II. "Due to operational requirements and pace of operations."

I. #35
II. "While deployed the ship is in an operational environment where the availability pf parts directly relates to mission fulfillment. While in home port a delayed part does not directly impact real world operations."
III. "Private industry has the edge in tracking parts. A part's visibility is much greater using commercial (Fed EX, DHL) tracking systems."

I. #36
III. "Current operating budgets are insufficient to met the demands of ships at present. Asking them to incur additional costs for enhanced means of tracing parts is completely unrealistic. This cost should be incorporated within the FISC. The savings they realize by reducing lost parts and associated shipping costs as well as man hours currently utilized to track parts manually should be sufficient to pay for the cost of enhanced tracking.

Currently, plans are in the works to implement radio tags on all parts shipped. This will allow tracking of parts similar to FEDEX and UPS."

I. #38
II. "Material readiness is crucial during deployment."

I. #39
II. "1 percent of any commands budget is still too much. Being deployed would have no bearing, as you are still at the mercy of the delivery system, (i.e in port, unrep)."

I. #40
III. "While conducting the survey, I appreciate the avenue you are exploring. I do not feel it really captures the reality of the small ship navy. As I conclude my Suppo tour on a FFG I can tell you that all the data is currently out there. The SYSTEM does work when connectivity works. That has been the single biggest factor in tracking parts is the poorly supported INMARSAT. I do not think any survey of parts support would complete without looking at that aspect of the picture.

Again I am not convinced that a simple number matrix captures the data you are looking for. When connectivity is good status is an easy game. When connectivity is bad.....we are up the creek without a paddle. From my perspective there are ample programs to track parts, however in the big picture INMARSAT the Navy satellite system is outdated, obsolete and a piece of junk. Sorry to deviate from the question but I see where you are going and feel this tangent would be worthy of adding to your matrix.

A. How do you retrieve status? As the Navy has gone away from naval Message to internet based, there is no program when the connectivity is down.

B. How often is your satellite connectivity degraded? FFG class, from talking to my fellow chops greater than 25%. During our recent underway we had zero connectivity for 30 days. All of the programs the navy is incorporating CMP, CITI BANK certification, etc require connectivity."

I. #41
III. "-Greatest hindrance to successful parts tracking while deployed continues to be connectivity. There are a variety of useful tools for afloat Supply Officers to utilize but bandwidth restrictions on NON-SHF ships plagues our ability to access the internet and utilize the resources that are out there.

-Items shipped commercially (FedEx, UPS, etc) are much easier to track s they have a dedicated tracking number and it is as simple as going to the website and finding out where the part is located. Navy material often ships without any sort of TCN and once it is inducted at the point of issue into the transportation system we lose sight of it until it either arrives onboard or if it is transhipped at some point it may make it onto a cargo manifest-if it is being look for and if it is a pri 2 or 3, beyond that the people are simply overwhelmed with quantity. Hardest question to answer most days is 'where is the part now?' and electronic cradle to grave tracking would certainly help alleviate that problem.

-Note on question 11, time spent tracking parts applies to S1 personnel, not the rest of my staff.

-Note on question 15, ISIC may not be charged but probably should be, or the TYCOM level. I would be willing to take a small cut in my operating budgets for the purpose of total visibility but don't make it a bill that I have to pay, make it a force level charge that is centrally funded at the claimant level."

I. #42
III. "- Question 17: 'routine' parts tracking (both deployed and at home is insufficient, practically non-existent).

- Question 17: During deployment (sep-Dec 02), I used to receive a hi-pri tracking document that basically tracks where my CASREP's and ANOR's were and it was updated every few hours....Had never heard of it before (from Athens or other Suppo's) and it just started showing up in my email....However, it proved to be very valuable.

- Question 18: FEDEX itself is not the problem-their system is great...it's once it gets into the hands of the Navy....For example, at FISC and DDNV overnight packages can sit there for literally 2-3 days...they receive so much overnight volume that there is no urgency to move it...I never FEDEX anything there that I truly need now....on deployment same thing-tracking it to theater is not the problem....It is the Sig/Bah to CVN/CLF to me where I have no visibility."

I. #43
II. "Absolutely. This is the biggest headache and ensure operational readiness. The biggest issue on funding levels for this program would be the color of funding. I would assume OTHER, but OTHER funding is presently very limited. With that being said, I would still be willing to make some sacrifices on OTHER to accommodate a better logistical tracking system."
III. "The biggest problem with EDEX or commercial delivery systems is that they do not normally deliver to an FPO address. You need a physical address. If something could be worked out to allow delivery directly to ships while in port, this would decrease lead time and minimize parts being lost in the 'frustrated material bins.'"

I. #48
III. "As a logistician, on the boat or in direct support of the waterfront, this information is imperative. But with that said, the end user has neither the time nor the manpower to track his requirements. The boat really needs to know when they are going to receive the material. Tracking it en route is really of no benefit."
I. #49
III. "The extensive personal intervention and the key locations of their various detachments around the world makes the PMO system responsive, reliable, and useful.

Under the current TAC system---most of us have no idea how much we spend on transportation costs on an annual basis---and when we are moving parts to support CASREPS for deployed, nationally tasked, units----frankly we don't care. It is not possible to say what percentage of our budgets we would be willing to commit to a better system since we are ignorant to what the cost is now."

I. #51
II. "Status of routine shipments is more difficult to ascertain while on deployment. Many routine requisitions tend to sit in CONUS for extended periods of time before being moved overseas via merchant ship. High priority requisitions are much easier to track due to the outstanding job being done by the Atlantic Fleet Logistics Support Center and the Priority material Officer in Bremerton."
III. "I would give a 7 (excellent) for high priority parts tracking. Both while deployed and at home base. I would give a 1 for routine requirements. NAVTRANS current tracking system provides little assistance with routine requisitions.

While at home base I can track FED-EX or UPS shipments to our pick up point. Unfortunately, while on deployment, much of the tracking goes away once it hits Norfolk."

I. #52
III. "GTN provides solid tracking for all priority parts...although TCN vs. Lead TCN sometimes presents an issue if you do not know what TCN your low-pri part was packed under."

I. #53
III. "Currently, the DoD is attempting to mimic commercial ITV and premium expediting services. This means a lot of time and effort to build the mousetrap that has already been built. For CONUS movement of material, there should be no DTS – it should all be done commercially, with regional consolidation/LTL sites where it makes good business sense. OCONUS, a mix of military/civilian methods – like WWX – seems to work fine.

The problem comes in trying to get ITV of material in the pipeline. Even with GTN, trying to figure out what is coming in a multi-pack under a lead TCN is almost impossible. Commercial systems, such as G-LOG, don't suffer from that, and provide the ability to redirect material as necessary.

Finally, ICP/DLA generated EDD's are almost worthless for planning purposes...trying to use MILSTRIP status to plan a maintenance action is a frustrating and fruitless task.

Whatever RFDI technology we implement, if we aren't following commercial material marking conventions – UPC, etc. – then we continue to perpetuate stovepiped systems that fail to continue to keep pace with our commercial counterparts."

I. #55
II. "It makes sense. If deployed, you need all the support you can get even more than on shore because of the disconnection from land."
III. "It would be ideal to have better tracking systems that could eliminate expeditors to better utilized in other areas. Part number requisitions are the worst for tracking. There is very little support in that area and it is an extremely slow process/program just to update status. The program for part number requisitions is called ANSRS website: https://nicppla11.fmso.navy.mil/ansrs/"

I. #56
III. "Primary concern of S-8 while in port is the receipt an shipping of parts. Items that come aboard the ship have been received. Underway, we track hi-pri items and availability of air transportation. This 'tracking' starts after the items have been received by our unit (beach detachment).

Another consideration that we sue when tracking stock items (low pri) is at what point that material will be received for disposition. That way, we know what we will be receiving and can prepare for the work-load.

Day to day status tracking is handled by Stock Control and Aviation Supply."

I. #57
II. "I have anywhere from 100-150 parts I'm tracking on average each day we are deployed. Currently, all the information I require is on GTN. The only problem I have with GTN, as with any web based tracking system, is bandwidth limits are ability to access the information. Consistently, websites timed out, slowing the process tremendously. The greatest help in racking parts would be to increase bandwidth allowing access to current websites."

I. #59
II. "Cause that's where it counts...all about meeting readiness needs. ITV is key."
III. "'what you are willing to pay for ITV' was the key question in this thing. The cost for RFID enabling will be passed to the 'customer'...Fleet. So, there's no choice, it is additional capability that comes at a cost. The question therefore is of what value is the additional ITV to the fleet-what's its contribution to readiness? A good value or not?"

I. #63
II. "Status is difficult to get and mission critical."

I. #64
III. "Update status for routine requisitions is difficult to obtain and manually intensive. Priority parts tracked through Priority Material Office are easy to track and expedite."

I. #65

II. “Relative isolation and poor connectivity make tracking parts very difficult on deployment.”

I. #67
II. “Tip of the spear.”

I. #71
II. “Hopefully it helps in tracking parts.”

I. #72
II. “More links to the Supply Chain. I might need more assistance.”

I. #73
II. “Cost savings for SIT reqns lost due to lack of visibility and tracking information.”

I. #74
III. “Deployed: Tracking parts to a hub such as Bahrain was easy and efficient but ever seeing the material again once it got there was hit or miss. “Bahrain is where parts go to die.’ I’m still receiving material that got stuck there more than a year ago. FEDEX was great about getting material into theater quickly but it didn’t matter once the military or contractor at the hubs took over.

Home Base: Parts and material can be moved quickly to the base and still take days to get to the ships. You get answers like ‘oh, that was delivered to Door 29 so it will take another 2 days to get received, staged and released to the LSR to deliver to the ship.’”

I. #75
II. “BETTER VIS = BETTER TRACKING = GREATER ABILITY TO EXPEDITE = SHORTER CWT. DEPLOYED REQUIREMENTS TEND TO BE MORE CRITICAL AND TIME SENSITIVE.”

I. #83
II. “There are more assets available to track.”

I. #84
III. “Any system that I would endorse would have to be ‘bandwidth’ friendly. Our internet is very slow underway (if it even works) and most tracking tools are internet based. I would prefer a system that ‘pushes’ information to me via SALTS/Email that had an electronic follow up system that ensued I received the message.”

LIST OF REFERENCES

1. Wynne, Michael. *Memorandum Policy for RFID*, Acting Undersecretary of Defense, 2 October 2003. http://www.rfidjournal.com/article/view/604 accessed 31 May 2004.

2. MacDonald, Steve. *Radio Frequency Device (RFID).* Point Paper, Washington DC, 4 November 2003.

3. Sawyer, Gary. *Chips for Everything.* New Scientist, October 19, 2002, pp. 44-47.

4. Booth-Thomas, Cathy. *The See it All Chip,* Time Magazine, New York, 22 September 2003, pp. 8-16.

THIS PAGE INTENTIONALLY LEFT BLANK

INITIAL DISTRIBUTION LIST

1. Defense Technical Information Center
   Ft. Belvoir, VA

2. Dudley Knox Library
   Naval Postgraduate School
   Monterey, CA

3. Professor Nicholas Dew
   Naval Postgraduate School
   Monterey, CA

4. Professor David R. Henderson
   Naval Postgraduate School
   Monterey, CA

5. Commander Steven MacDonald
   Office of the Chief of Naval Operations,
   Supply Operations & Policy, (OPNAV N413T)
   Washington, D.C.

6. Lieutenant Commander Christopher J. Corrigan
   Bunker, MO

7. Lieutenant Jayson Kielar
   Tarpon Springs, FL