DOCUMENTED BRIEFING

RAND

Establishing a Baseline and Reporting Performance for the Order and Ship Processes

Kenneth J. Girardini, William Lewis,
Rick Eden, Earl S. Gardner

Arroyo Center

The research described in this report was sponsored by the United States Army under Contract No. DASW01-96-C-0004/#A1.

ISBN: 0-8330-2459-0

The RAND documented briefing series is a mechanism for timely, easy-to-read reporting of research that has been briefed to the client and possibly to other audiences. Although documented briefings have been formally reviewed, they are not expected to be comprehensive or definitive. In many cases, they represent interim work.

RAND is a nonprofit institution that helps improve public policy through research and analysis. RAND's publications do not necessarily reflect the opinions or policies of its research sponsors.

Published 1996 by RAND
1700 Main Street, P.O. Box 2138, Santa Monica, CA 90407-2138
1333 H St., N.W., Washington, D.C. 20005-4792
RAND URL: http://www.rand.org/
To order RAND documents or to obtain additional information, contact Distribution Services: Telephone: (310) 451-7002; Fax: (310) 451-6915; Internet: order@rand.org

DOCUMENTED BRIEFING

RAND

Establishing a Baseline and Reporting Performance for the Order and Ship Processes

Kenneth J. Girardini, William Lewis, Rick Eden, Earl S. Gardner

Prepared for the United States Army

Arroyo Center

PREFACE

This document annotates a slightly modified version of an executive briefing that was presented to the Logistics Triad conference in August of 1995. Senior leaders in attendance at the briefing included the Logistics Triad--LTG Johnnie E. Wilson, Deputy Chief of Staff for Logistics (DCSLOG); LTG John G. Coburn, DCG, Army Material Command; and MG Thomas Robison, CG, CASCOM--as well as many others.

The briefing presents metrics for measuring the Army's order and ship times. The metrics are then applied with empirical data to establish a baseline for order and ship times for requisitions filled from wholesale supply. The baseline provides a basis for gauging future improvements to order and ship times.

The work presented is one piece of a larger body of work encompassed under Velocity Management (VM). VM is an approach for improving the responsiveness and efficiency of the Army logistics system by systematically reengineering every logistics process (e.g., repair, order and ship, stockage determination, financial management). By improving dramatically the speed and accuracy of all logistics processes, VM is reducing the need for massive logistics resources.

The briefing should be of wide interest in the Army because the Army's senior leadership has endorsed Velocity Management as the Army's paradigm for improving the performance and reducing the costs of its logistics system. This briefing should also be of interest to those outside the Army working to improve order and ship and other logistics processes.

Velocity Management is being developed in a RAND research project entitled "Velocity Management: An Approach for Improving Logistics Responsiveness" sponsored by the Army DCSLOG. The research is being conducted in the Military Logistics Program of RAND's Arroyo Center, a federally funded research and development center sponsored by the United States Army. John Dumond is the director of the program; John Folkeson and Rick Eden are the project leaders. Comments and questions regarding Velocity

Management are of course welcome and should be directed to the project leaders.

Velocity Management is also the topic of an article in *Army Logistician* by MG Robison, CG CASCOM and the Army's Executive Agent for VM implementation:

- "Velocity Management: An Initiative to Improve the Army Logistics System," *Army Logistician*, May-June 1995, pp. 10-11.

Readers interested in an overview of VM should order (available from RAND Distribution Services, 310/451-7002 [voice], 310/452-6915 [fax], or e-mail at order@rand.org):

- DB-126-1-A, *Velocity Management: An Approach for Improving the Responsiveness and Efficiency of Army Logistics Processes*, 1994.

CONTENTS

Preface iii

Summary vii

Acknowledgments xvii

Glossary xix

1. INTRODUCTION 1

2. DESCRIPTION OF BASELINE DATA SET 3

3. DESCRIPTION OF METRICS 13

4. BASELINE PERFORMANCE 20

5. PROPOSED PERIODIC REPORTING MECHANISM 32

Appendix A: Analysis of Selected Attributes 40

Appendix B: Analysis by Post by Month 49

Appendix C: Analysis of Periodicity 70

SUMMARY

This briefing documents analysis conducted to establish baseline order and ship time (OST) performance and propose periodic reporting mechanisms for the Army's order and ship processes. The analysis is in response to a request by then-DCSLOG, LTG Johnnie Wilson, for a baseline with which to compare improvements in OST. Elements of this briefing were presented to the Army logistics leadership during a Logistics Triad conference in August 1995.

DEFINING THE ORDER AND SHIP PROCESSES

Figure S.1 depicts at an aggregate level the information flow (left to right on the top) and materiel flow (right to left on the bottom) associated with CONUS requisitions. Requisitions filled by wholesale supply are depicted in loop D and can originate from customer units at any of the three installation/retail echelons depicted in the figure (company, SSA, or Corps/DOL). Requisitions to wholesale supply can also be generated to replenish local stocks at these

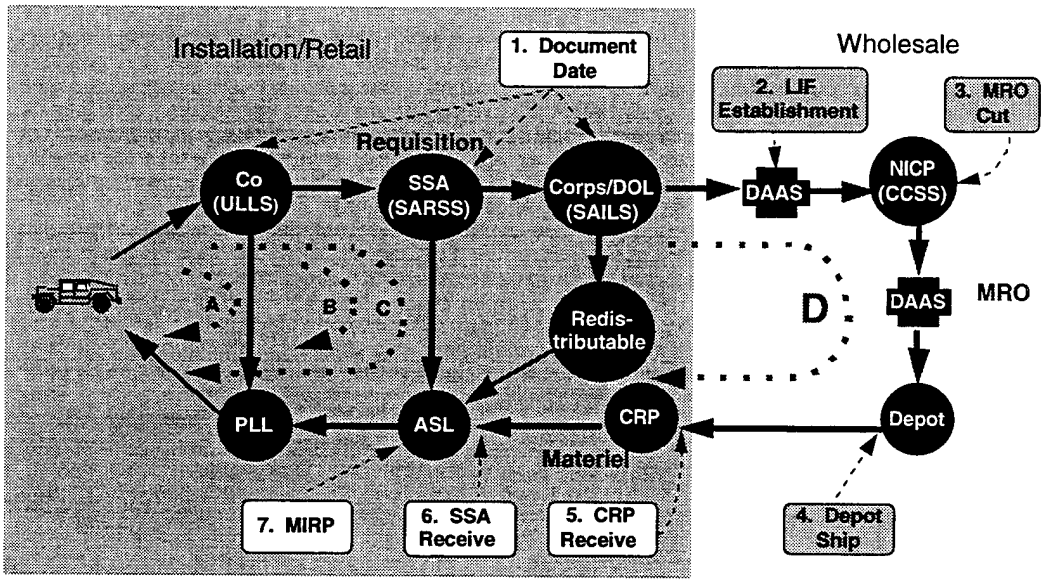


Figure S.1—Order and Ship Processes and LIF Measurement Points

echelons. The order and ship process for requisitions filled from wholesale supply includes the transfer of information (i.e., the requisition) to the responsible NICP, NICP processing and communication of a material release order (MRO) to a distribution depot, and the picking, packing, and shipment of the material from the distribution depot to the supporting SSA.

OSTs for requisitions filled from retail stocks are not included in the data we analyzed (loops A, B, and C in the figure). Hence, the times reported in this briefing do not represent the OSTs associated with all Army CONUS requisitions, but rather only those filled from wholesale supply.

MEASURING THE ORDER AND SHIP PROCESSES

Establishing a baseline has helped the Order and Ship Process Improvement Team (O&S PIT) to understand current performance and begin to diagnose performance drivers. The data used to measure CONUS (and OCONUS) requisitions filled by wholesale supply are captured in the Logistics Intelligence File (LIF), maintained by the Logistics Support Activity (LOGSA). A record is established in the LIF for each Army requisition that passes through the Defense Automatic Addressing System (DAAS). As depicted in Figure S.1, the LIF records seven dates for CONUS requisitions filled by wholesale supply.

When a requisition is first entered electronically, the document date is recorded in the document number, which serves as a unique identifier. The second date in the LIF is established when a requisition is received at DAAS. The days elapsed from the document date to the established date provide a measure of the time it takes to get a requisition off-post.

The third date in the LIF is established when a materiel release order (MRO) is processed by the NICP. The days elapsed from the established date to the date on the MRO represent a measure of the time required for NICP processing (the time associated with wholesale backorders accumulates in this segment).

The fourth date in the LIF is established when the depot ships the materiel. The days elapsed from the MRO date to the depot ship date represent a measure of the time required for depot processing.

The fifth date in the LIF is established when the central receiving point (CRP) (or any receiving point on post) acknowledges reception of the materiel.

The days elapsed from the depot ship date to the CRP receive date represent a measure of the time required for transportation.

The sixth date in the LIF is established when the direct support unit (DSU) receipts the shipment. The days elapsed from the CRP receipt date to the DSU receipt date represent a measure of the time required for CRP processing (from a receiving area to a shipping area) and on-post transit.

The seventh date in the LIF is the master inventory record processing (MIRP) date. The MIRP is the date when the material is entered into the accountable record of the SSA. The days elapsed from the SSA receive to MIRP represent a measure of the time required for SSA processing.

We defined all the requisitions that MIRP (i.e., have a MIRP date in the LIF) in the 12-month period prior to 1 July 1995 as the baseline data set. Because the baseline data set was selected based on MIRP date, every requisition has at least a document date and a MIRP date, and the days elapsed between them is an estimate of total OST. The baseline data set contains 4.9 million requisitions. Subsets of the baseline data set can be selected to investigate performance by post, component, class of supply, source of supply, etc.

PERFORMANCE METRICS FOR OST

To focus process improvement efforts, the VM initiative needs metrics that evaluate both average performance and variability in performance. Figure S.2 shows two ways of depicting OST performance. In the graph on the left side of the figure, the X-axis is in days, and the value graphed on the Y-axis represents the percent of the requisitions for which the elapsed days from document date to MIRP date is X; that is, integrating over all X results in 100%. We graphed the entire distribution of OSTs, although OSTs greater than 120 days are accumulated at 120.

Two different subsets of requisitions are graphed. The first, displayed as a line, includes all 4.9 million requisitions in the baseline data set. The second, displayed as an area chart (actually individual bars for each day with no gaps between them), excludes backorders, which make up about 700,000 or about 15% of the overall baseline data set (i.e., the second curve is associated with the 4.2 million requisitions [85%] from the baseline data set that were not

backordered). The two resulting curves, with and without backorders, look very similar, but the means differ dramatically (50.4 versus 38.3 days).

To overcome the limitations of relying solely on the mean, we also use three other metrics to describe OST performance:

1) the number of days required to fill 50% of the requisitions,
2) the number of days required to fill 75% of the requisitions, and
3) the number of days required to fill 95% of the requisitions.

The 50th percentile (median) measures the OST associated with a typical requisition, while the 75th and 95th percentiles measure OST associated with increasingly outlier requisitions and the variability in performance.

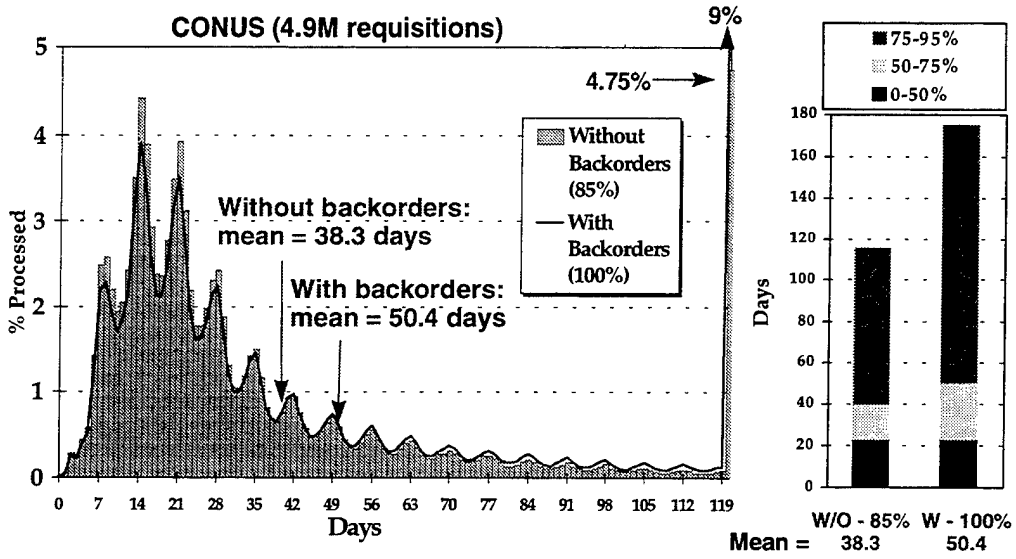


Figure S.2—Median, 75%, and 95% Depict Both Typical Performance and Variability

At the right of Figure S.2, these metrics are shown plotted for the same two samples in a bar chart. For the sample without backorders, 50% of the requisitions are filled in 23 days or less (i.e., integrating the distribution shown in the chart at left without backorders from 0 to 23 days would result in 50%), so the height of the first segment is 23 days; 75% are filled in 40 days or less, so the height of the second segment is 40 days; and 95% are filled in 116 days or less, so the height of the third segment (and overall bar) is 116 days (5% of

the requisitions take more than 116 days, but these are not captured in the bar chart). The bar charts show that the 75th and especially the 95th percentiles reflect the much greater variability associated with OST when backordered requisitions are included.

BASELINE MEASUREMENTS OF OST PERFORMANCE

A key result of our analysis of the baseline data set is that the sample of requisitions included when measuring OST (e.g., whether or not backorders are included, as seen above) is very important and the selection criteria need to be carefully stated. For example, of the 4.2 million nonbackordered requisitions, active FORSCOM and TRADOC units account for 54%, the National Guard account for 28%, and Army Material Command (AMC) industrial operations (e.g., maintenance depots) account for 9%. Performance varies considerably across these samples, reflecting differences in the retail portions of the associated order and ship processes. Another source of differences is the class of supply. Surprisingly, priority has less effect than anticipated.

Our analysis concentrated on the 1.7 million requisitions associated with nonbackordered class IX requisitions from active TRADOC and FORSCOM Army units. In one excursion we stratified this sample by post, focusing on the four VM posts: Ft. Bragg, Ft. Campbell, Ft. Hood, and Ft. Irwin. Our analysis establishes baseline OSTs for each of these posts and shows that the baseline OST is currently far from achieving the short-term VM goals (7 days for Issue Priority Groups [IPG] 1 and 2 and 10 days for IPG3, derived from a September 1995 Memorandum signed by the DCSLOG, LTG Johnnie Wilson) and longer-term VM goals (3 days for IPG1, 4 days for IPG2, and 8 days for IPG3, derived by the O&S PIT) for requisitions filled from wholesale supply (see Figure S.3).

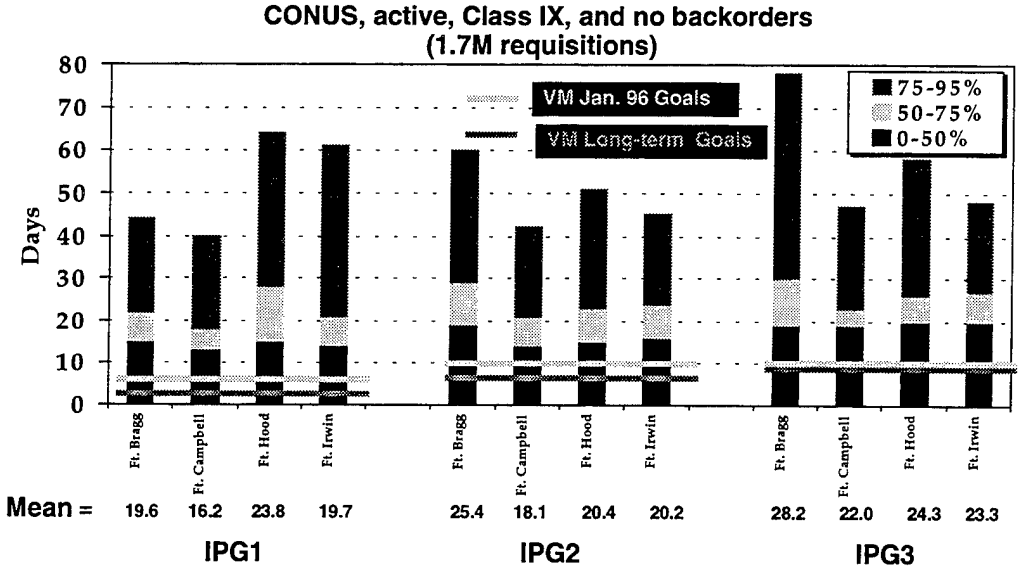


Figure S.3—Baseline OSTs at VM Posts Far Exceeds Both Short- and Long-Term VM Goals

PROPOSED REPORTING MECHANISMS FOR OST PERFORMANCE

Effective reporting of OST performance provides important information both to senior leaders and to those charged with improving O&S performance locally. The final section of this briefing proposes reporting mechanisms to meet their needs.

Figure S.4 depicts the proposed format for reporting to senior leaders on the progress of posts in improving OST performance--in this case, Ft. Bragg IPG1 requisitions. It plots the mean, median, and 75th and 95th percentiles for all requisitions that MIRP in the month shown on the X-axis. We have included the twelve months associated with the baseline data set in the figure. That is, because we are charting a trend over time, we have shifted from twelve segmented bars, one for each month (along with a mean), to a line chart with four lines. The heavy lines to the right of the line chart depict the range for the monthly 50th, 75th, and 95th percentiles during the baseline period. These ranges also highlight the fact that in any given month there is considerable variability in the OST metrics.

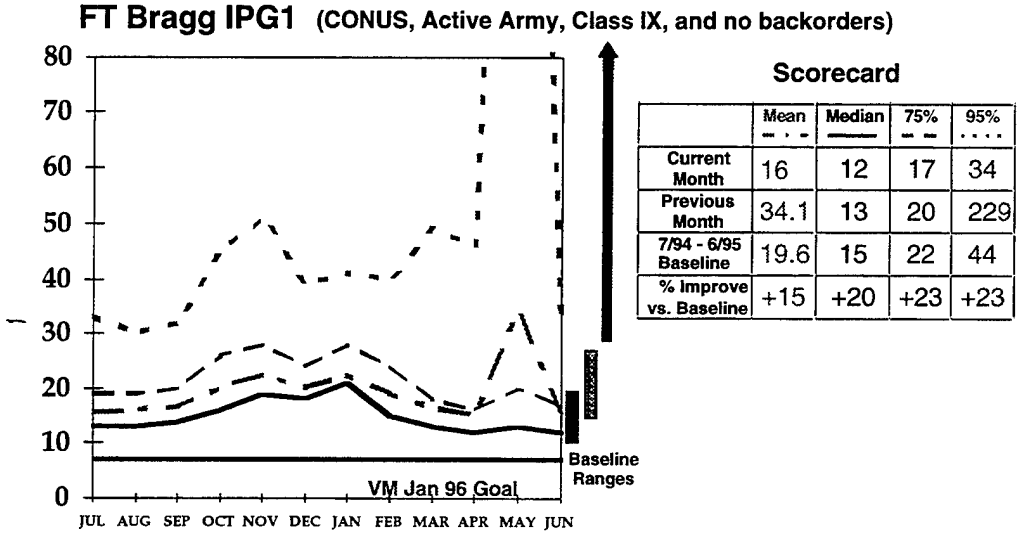


Figure S.4—Example of Monthly reporting mechanism

The line at the bottom of the figure represents the interim (January 1996) VM CONUS goal for IPG1 OSTs. To reach the goal, the lines for each metric (in particular, the line associated with the 95th percentile) will have to fall below the line associated with the goal.

As a further mechanism for reporting progress, a "scorecard" is included on the right of the chart. The scorecard highlights the OST performance for each of the most recent two months, the baseline period, and the percent improvement from the most recent month compared to the baseline for each of the metrics (mean, median, and 75th and 95th percentiles).

As part of the VM methodology, all of the VM posts have organized site improvement teams (SITs). The VM SITs are handling the day-to-day process analysis and improvement tracking at the local level. Monthly reports of the full O&S cycle are important and useful to them. However, they also need more timely (e.g., weekly) and precise (e.g., segment-by-segment) data to help them lead the improvement efforts for their customers. Under current implementation guidance, the SITs will receive two reports from LOGSA. The first is a weekly report broken out by segment. The sample for each segment is

the requisitions that closed that segment in the previous week: For example, all requisitions that have an establish date in the previous week will be used to generate the mean, median, and 75th and 95th percentile times for the segment from document date to establish date.

The second report from LOGSA is a monthly report that is selected based on MIRP date (i.e., consistent in the manner in which the baseline data set was selected). This report can be used to update monthly progress charts such as the one in Figure S.4.

For both the monthly and weekly reports, the SITs receive OST measurements for individual SSAs (and associated customer Department of Defense activity address codes [DODAACs]) to help identify performance drivers. SITs can also receive reports from LOGSA on individual document numbers that were outliers and electronic extracts of the LIF data for their own analysis.

EXPECTED FUTURE TRENDS FOR OST

In the coming months the Army should expect to see steady progress in reducing order and ship times as many process changes already identified are implemented. Analysis of the baseline data set suggests the retail segments (document date to establish date, and CRP receive to MIRP) provide the greatest opportunity to reduce the variance (reflected in the 75th and 95th percentiles). The wholesale segments (establish date to CRP receive date) provide opportunities for steady improvements in typical performance (the median). However, improvements in both average performance and variability in all segments of the process will be needed to achieve both the short- and long-term VM goals for OST.

While steady progress is anticipated, the VM initiative is not a controlled experiment, and there are likely to be other events that will influence OSTs. These include other logistics initiatives, deployments, field exercises, and unanticipated data problems. Also, there will be some delays before progress shows up in the monthly reports which are based on MIRP date. For example, some of the outliers for the requisitions that MIRP in the coming months may already have completed the document date to established date segment before any VM initiatives were implemented. This effect should be reduced over time.

The O&S PIT is working on expanding its focus to include other sources of requisitions (beyond active FORSCOM and TRADOC units), other classes of supply, and OCONUS units. We are also working with data from the Integrated Logistics Analysis Program (ILAP) to measure OST for requisitions filled from retail supply (e.g., SSA).

ACKNOWLEDGMENTS

The Velocity Management concept and its implementation reflect the vision and leadership of the Velocity Group, a coalition of senior Army logisticians. The Velocity Group is headed by LTG John G. Coburn, the Army DCSLOG; LTG Dennis L. Benchoff, DCG AMC; and MG Robert K. Guest, CG, CASCOM. MG Guest serves as Executive Agent for implementation of Velocity Management throughout the Army.

This document reflects the contributions of numerous Army and RAND personnel. We especially want to thank the members of the VM Order and Ship Process Improvement Team, headed by Thomas J. Edwards, Deputy to the Commander, CASCOM. Our analysis of current order and ship process performance could not have been completed without the assistance of the Army Logistics Support Activity (LOGSA), which provided data extracts from the Logistics Intelligence File. The LOGSA staff are working hard to make comparable data available to SITs at Army installations throughout the world so that improvement efforts can continue to expand.

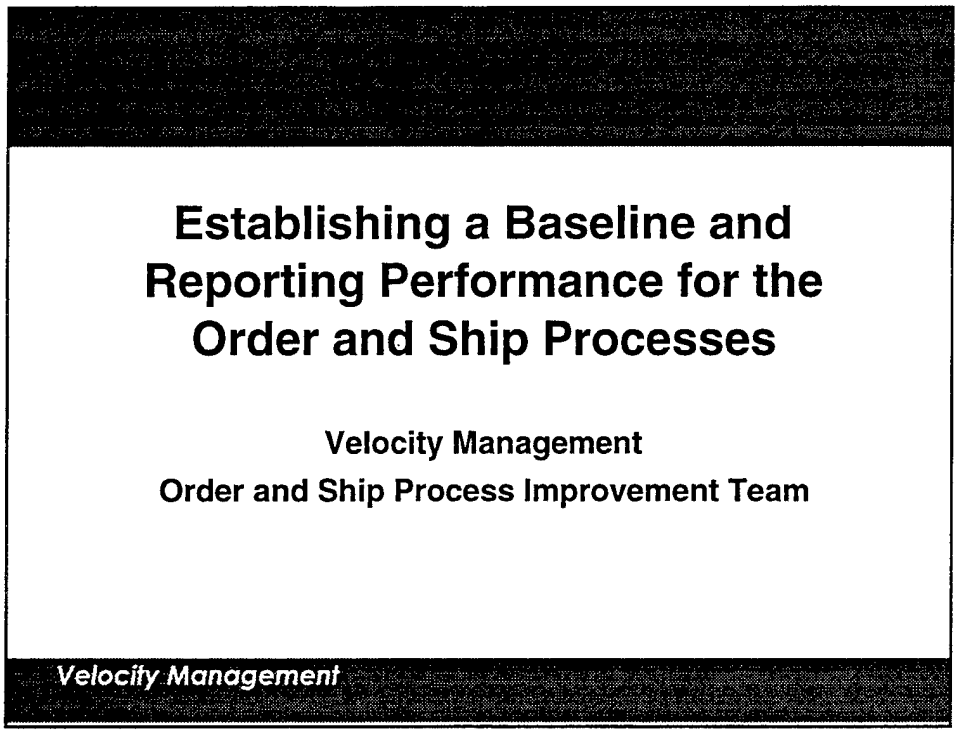
At RAND, the authors thank John Dumond, John Folkeson, Art Lackey, and Marc Robbins for providing constructive criticism of earlier versions of the briefing and Jan Harris for preparing the manuscript.

GLOSSARY

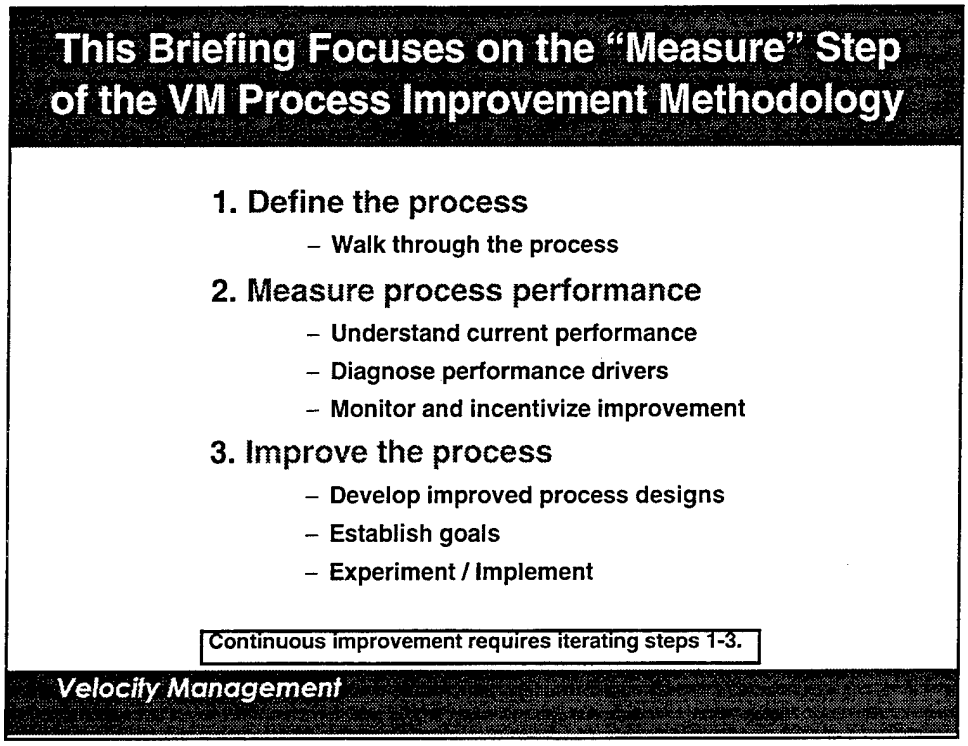
AMC	Army Materiel Command
AMS	Automated Manifest System
ASL	Authorized Stockage Level
AWP	Awaiting Parts
CCSS	Commodity Command Standard System
CO	Company
CONUS	Continental United States
CRP	Central Receiving Point
D6S	Message to DAAS acknowledging the receipt of materiel at the SSA
DAAS	Defense Automatic Addressing System
DLA	Defense Logistics Agency
DODAAC	DoD activity address code
DOL	Director(ate) of Logistics
DSS	Depot Standard System
DSU	Direct Support Unit
DWASP	A data processing system
FORSCOM	Forces Command
GSA	General Services Administration
ILAP	Integrated Logistics Analysis Program
IM	Item Manager
IPG	Issue Priority Group
LIF	Logistics Intelligence File
LOGSA	Logistics Support Activity
MIRP	Master Inventory Record Posting
MRO	Materiel Release Order
MSC	Major Subordinate Command
NICP	National Inventory Control Point
NG	National Guard
O&S	Order and Ship
OCONUS	Outside the Continental United States

OST	Order and Ship Time
PIT	Process Improvement Team
PLL	Prescribed Load List
ROTC	Reserve Officer Training Corps
SAILS	Standard Army Intermediate Level Supply System
SAMMS	Standard Automatic Materiel Management System
SAMS	Standard Army Maintenance System
SARSS	Standard Army Retail Supply System
SARSS-O	Standard Army Retail Supply System-Objective
SDS	Standard Depot System
SIT	Site Improvement Team
SOP	Standard Operating Procedure
SSA	Supply Support Activity
SSF	Single Stock Fund
STAMIS	Standard Army Management Information System
TK4	Message to DAAS acknowledging the receipt of materiel at the installation
TK6	Message to DAAS acknowledging the receipt of materiel at the SSA
TRADOC	Training and Doctrine Command
ULLS	Unit Level Logistics System
UMMIPS	Uniform Movement Materiel and Issue Priority System
VM	Velocity Management

1. INTRODUCTION



This briefing documents analysis performed to establish a baseline and propose periodic reporting mechanisms for the Army's order and ship processes. Elements of this briefing were presented to the Army logistics leadership during a Logistics Triad conference in 1995.

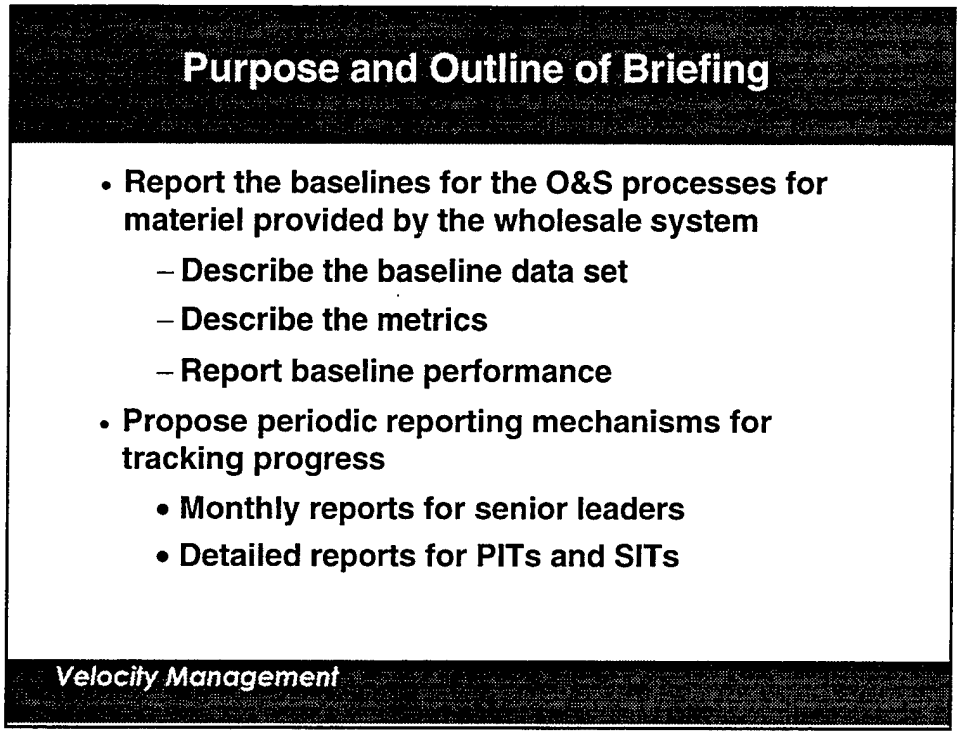


This briefing focuses on performance measurement, which is one step in the Velocity Management (VM) process improvement methodology, shown in the chart. More specifically, this briefing reports on the time metric for the order and ship (O&S) process, referred to as the order and ship time (OST).

There are at least three reasons for measuring a process: (1) to understand current performance, (2) to help diagnose performance drivers, and (3) to monitor improvement. Using measurements to understand current performance and diagnose performance drivers often leads to insights for improved process design. Also, measurements provide feedback that result in incentives for improved performance.

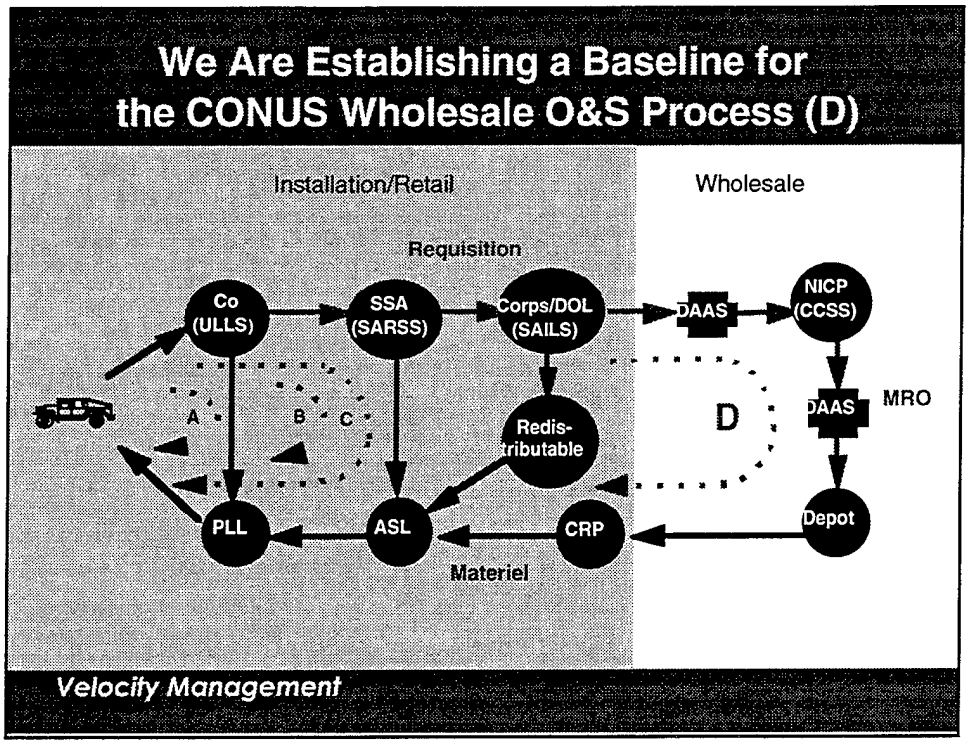
In this briefing we focus on the first reason for measuring performance. However, we also begin the task of diagnosing performance drivers.

2. DESCRIPTION OF BASELINE DATA SET



This briefing has two purposes. The first is to report the baselines for the wholesale O&S processes. Before giving results, we describe the baseline data set and the metrics that we used to measure the baseline.

The second purpose of this briefing is to propose periodic reporting mechanisms for tracking the progress of initiatives intended to reduce OST. We propose reporting mechanisms both for the senior Army leadership and for those charged with the design and implementation of the process changes. These include the Order and Ship Process Improvement Team (O&S PIT), which is composed of functional and technical experts drawn from across the Army, and Velocity Management Site Improvement Teams (SITs), which are composed of local leaders and technical experts working to improve the order and ship activities that occur within a specific organization or location.

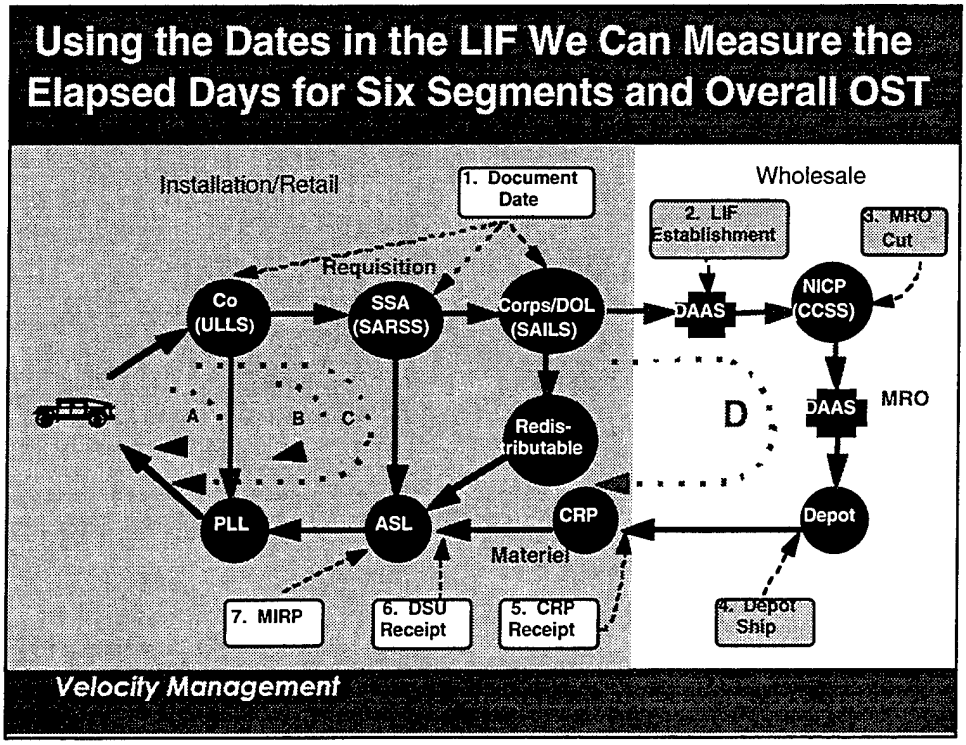


The chart above depicts at an aggregate level the information (left to right on the top) and materiel (right to left on the bottom) flows associated with the continental United States (CONUS). Requisitions filled by wholesale supply can originate from customer units at any of the three installation/retail echelons depicted above (company, supply support activity [SSA], or Corps/Directorate of Logistics [DOL]). Requisitions to wholesale supply can also be generated to replenish local stocks at these echelons. For a given customer of wholesale supply, loop D in the chart above depicts the typical[1] order and ship processes beginning with the transfer of information (i.e., the requisition) to the responsible national inventory control point (NICP), NICP processing to determine which distribution depot to ship the material from and then to communicate a materiel release order (MRO) to the depot, and the picking, packing, and shipment of the material from the distribution depot to the supporting SSA.

[1]There are variations by post. For example, initiatives generated by the O&S PIT have already altered the materiel flows at some posts.

OSTs for requisitions filled from retail stocks are not included in the data we analyzed (loops A, B, and C above). Hence, the times reported in this briefing do not represent the OSTs associated with all Army CONUS requisitions, only those filled from wholesale supply.

Moreover, since many of the wholesale requisitions are to replenish local stocks, the OSTs reported in this document do not represent the time required to satisfy requisitions for customers in the field (e.g., mechanic awaiting a part). For example, loop A occurs when the mechanic has a requisition filled directly from the prescribed load list (PLL), which is the local supply source at the company level. This would result in a requisition to replenish the "hole" created in the PLL. The PLL clerk then becomes the customer for the replenishment requisition that is filled from a higher echelon of supply. Loop B represents the process if the item required to replenish the PLL is stocked in the SSA's authorized stockage level (ASL). Or, as depicted in loop C, the requisitioned part may not be stocked in the PLL but in the SSA's ASL. If the hole in the PLL or the mechanic's request is filled from the SSA's ASL, then a hole is generated in the ASL. A requisition is then generated to fill the hole in the ASL, though the timing and size of the reorder is based on a reorder point. ASL replenishment requisitions may be filled from a higher installation-level echelon of supply (e.g., Corps' or DOLs' ASL) or, more likely, the wholesale level (loop D).



Data associated with CONUS and outside the continental United States (OCONUS) requisitions filled by wholesale supply are captured in the Logistics Intelligence File (LIF), maintained by the Logistics Support Activity (LOGSA). A record is established in the LIF for each Army requisition that passes through the Defense Automatic Addressing System (DAAS). The LIF records seven dates for CONUS requisitions. We refer to the days elapsed[2] between any two consecutive dates as a "segment" of the O&S process. The seven dates in the CONUS LIF are used to define six segments associated with the various stages of the O&S processes for requisitions on the wholesale supply system. We use the elapsed days from the document date to the Master Inventory Record Posting (MIRP) date, the first and last dates available in the LIF, as the total OST associated with a requisition. When reporting results for total OST and for each segment, we follow the convention that for a given requisition, if two end points of a segment have the same date, an elapsed days of 0 is assigned. These dates,

[2]Because the LIF currently has time stamps for events only in days, we measure time in elapsed days. However, efforts are underway to include time of day in the LIF. When this occurs we will be able to refine our measurements to hours and even minutes.

along with other data that can be used to identify specific attributes of the requisitions (e.g., class of supply, backorder indicators, etc.), form the basis of the baseline data set.

We now provide some background information on each of the dates in the LIF for CONUS requisitions.

When a requisition is first entered electronically, the document date is recorded in the document number, which serves as a unique identifier. All the transactions associated with the requisition refer to the document number. However, the document date recorded in the LIF does not necessarily equate with the beginning of the order process. At supply echelons prior to reaching DAAS, the document number for a requisition can be superseded by a new requisition with a new document number and document date (e.g., combining several requisitions for the same item into a single requisition). Also, the demand for an item generally occurs before it is recorded electronically into the supply system. Still, the document date provides the best measure we currently have for when the initial demand for an item occurs.

The second date in the LIF is established when a requisition is received at DAAS. When this occurs, a copy of the requisition is sent to LOGSA, establishing a record in the LIF (which then includes both the document and establish dates). The days elapsed from the document date to the establish date provide a measure of the time it takes to get a requisition off-post. This segment typically includes time to transfer information across echelons of supply (including the effects of the "sneaker net" and batch information systems), administrative and financial reviews, and any delays or interruptions in the operation of DAAS.

The third date in the LIF is established when a MRO is processed by the NICP. The days elapsed from the established date to the date on the MRO is a measure of the time required for NICP processing. This segment includes the time the document waits before the NICP initiates the program (Commodity Command Standard System [CCSS] for Army Materiel Command [AMC] NICPs, and Standard Automatic Materiel Management System [SAMMS] for Defense Logistics Agency [DLA] NICPs) that processes requisitions and generates MROs and the time required for the program to generate the MRO. If a requisition cannot be processed automatically (e.g., because of flags established by the item

manager to detect errors, exceptions, or allocate limited stocks), then this segment also includes the time waiting for item manager review, time waiting for the NICP's program to be run again, and reprocessing time. If the requisitioned item is not available in the wholesale supply system (or if access to limited supplies is denied by the item manager), the requisition is "backordered." The often substantial delays associated with wholesale backorders accumulate in this segment.

The fourth date in the LIF is established when the depot ships the materiel. The point at which the depot ship date is established can vary by depot and over time. Currently most depots use the date of driver sign-off or the date when the truck passes the front gate of the depot. The days elapsed from the MRO date to the depot ship date is a measure of time required for depot processing. This segment includes the time the MRO waits before the depot pulls in the input file containing the MROs,[3] run time for the program (DLA depots currently use three different programs: Standard Depot System [SDS], DLA Warehouse and Shipping Procedures system (DWASP), or Depot Standard System [DSS]) that processes MROs and generates pick tickets, and any time an MRO spends "banked" in the depot's information system. The "bank" refers to MROs that are held for transportation consolidation or workload management at the depot. When an MRO is in the bank it is stored in a file, and a pick ticket is not generated until a future run of the program. Once a pick ticket is generated, the segment includes the time required to pick, pack, and ship the quantities called for in the MRO, including any time spent consolidating material for packing (e.g., tri-wall) or shipment.

The fifth date in the LIF is used to close out the transit segment and is established when the central receiving point (CRP) (or any receiving point) acknowledges reception of the materiel with a TK4. Generating a TK4 currently requires off-line processing that is not part of the business process of receiving material. Hence, the reliability of this date, if it exists for a particular requisition

---

[3]DLA generally does not include this time in its own estimates of the time for depot processing, nor do its performance standards reflect the time MROs wait to be inducted into the depot's information system. This is one of those "unassigned" times between organizational boundaries. However, the O&S PIT is working to reduce this time in an initiative referred to as process synchronization.

in the LIF, generally varies by standard operating procedure (SOP) across CRPs and even by shipment at a single CRP. Automated Manifesting System (AMS) and other automated data collection methods being fielded by the Army should improve the future data quality. Given that there can be problems with the dates being fed into the LIF, we do not rule out the possibility of delayed CRP receipt dates[4] implying an erroneous measurement of the transit segment. Based on observations made while walking the process at the VM posts, we believe this is more likely a problem for outliers rather than a systemic problem affecting the CRP receipt date of each record in the LIF. Therefore, when analyzing the transit segment, it is best to focus on the median metric. At the installations where there is a high response rate on CRP receipt, we believe the days elapsed from the depot ship date to the CRP receipt date provide a good measure of the median time required for transit.

The sixth date in the LIF is established when the CRP sends a second TK4. While denoted direct support unit (DSU) receipt, it typically measures when the materiel is available for the SSA.[5] This may be when the materiel is placed in a bin in the shipping section of the CRP, or it may be based on SSA pickup or delivery. Again, the reliability of this date, if it exists for a particular requisition in the LIF, generally varies by SOP across CRPs and even by shipment at a single CRP. This segment is eliminated for some requisitions under one of the process changes being implemented in VM, which calls for direct delivery from the depot to the supporting SSA.[6]

The seventh date in the LIF is the master inventory record posting (MIRP) date. The MIRP is the date when the material is entered into the accountable

---

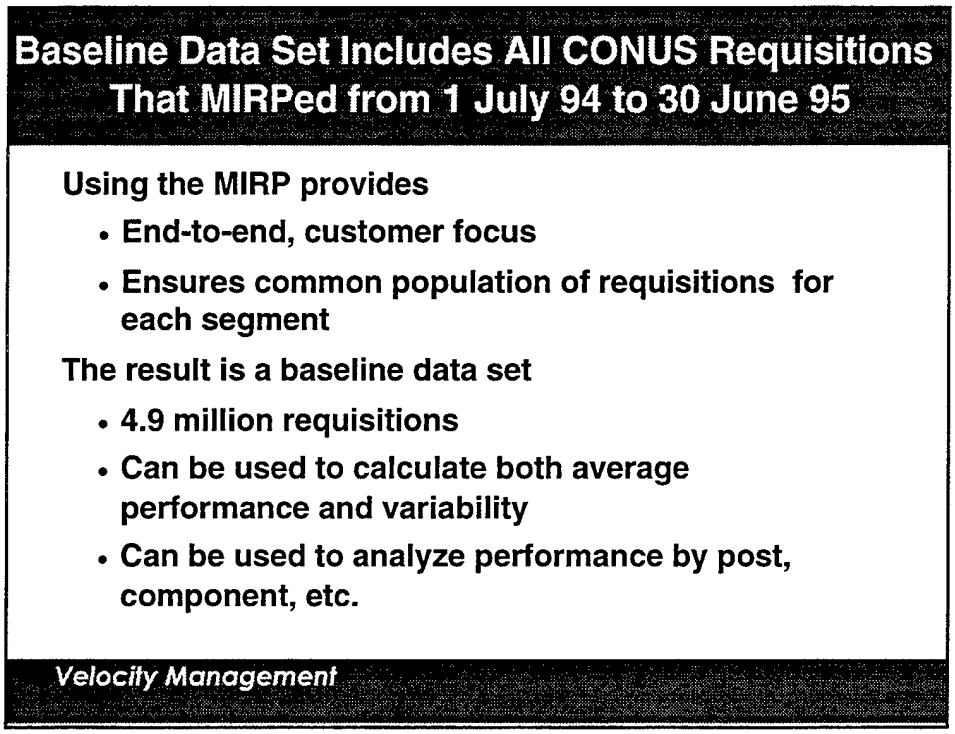
[4]To establish elapsed days in a segment, we must have the dates at both ends of the segment. When one or the other end point is missing or invalid, the size of the sample is reduced. The tables in Appendices A and B include information on the percent of requisitions that are missing for each segment.

[5]The DSU includes both supply and maintenance activities. The SSA refers to the supply activity in the DSU.

[6]When direct deliveries have been implemented at a post, we see a dramatic fall off in the number of records with data in the CRP receive and DSU receive fields of the LIF. Hence, reliably dating the end of the transit segment becomes more difficult, and we are forced to use the MIRP date. However, for this retrospective analysis using data from the baseline data set, which predates the implementation of this process change, the segments from depot ship to CRP receive and CRP receive to DSU receive are still valid (where CRPs where submitting the appropriate TK4s).

record of the SSA (which does not necessarily imply it is available on the shelf or has been placed in a customer's bin). For materiel that goes through the CRP, the days elapsed from the SSA receive to MIRP represent a measure of the time required for on-post transit and SSA processing.

The Army does not currently pass any information beyond SSA MIRP to the LIF. However, this represents completion of the order and ship process only for ASL replenishment requisitions originating from the SSA. For requisitions originating below the SSA (e.g., requisitions for PLL or shop stock replenishments or customer requisitions), there are additional process steps (e.g., SSA must place the item in the unit bin, Unit Level Logistics System [ULLS] clerk must check the bin at the SSA, receipt the material, and distribute to the end customer or place in PLL stock).



We defined all the requisitions that MIRPed in the 12-month period before 1 July 1995 as the baseline data set. Because our analysis showed that OSTs were not consistent across time, we chose a period long enough to capture at least annual variations over time. We chose requisitions based on the date the requisition MIRPed to get an end-to-end perspective on the order and ship process and provide a customer focus (i.e., the measure reflects the performance that the customer sees). Also, by using the MIRP date to select the baseline data set, we have a common population of requisitions for each of the six segments[7] of the order and ship process that can be measured using the seven dates available in the LIF.[8]

---

[7]Because of missing or invalid dates at one or both end points of a segment, the actual population used for each segment usually varies somewhat.

[8]How the baseline data set has been defined is important when comparing the times reported in this document to other results and using the data to establish performance by segment. Because the order and ship processes are currently very slow, using the MIRP date to establish the baseline data set implies that for some requisitions in the baseline data set, the dates associated with the first five segments might have occurred significantly before the MIRP date. This is particularly true for outlier requisitions that take an inordinate amount of time to fill. For example, to evaluate the segment associated with NICP processing, one may evaluate requisitions that have had an MRO cut in a

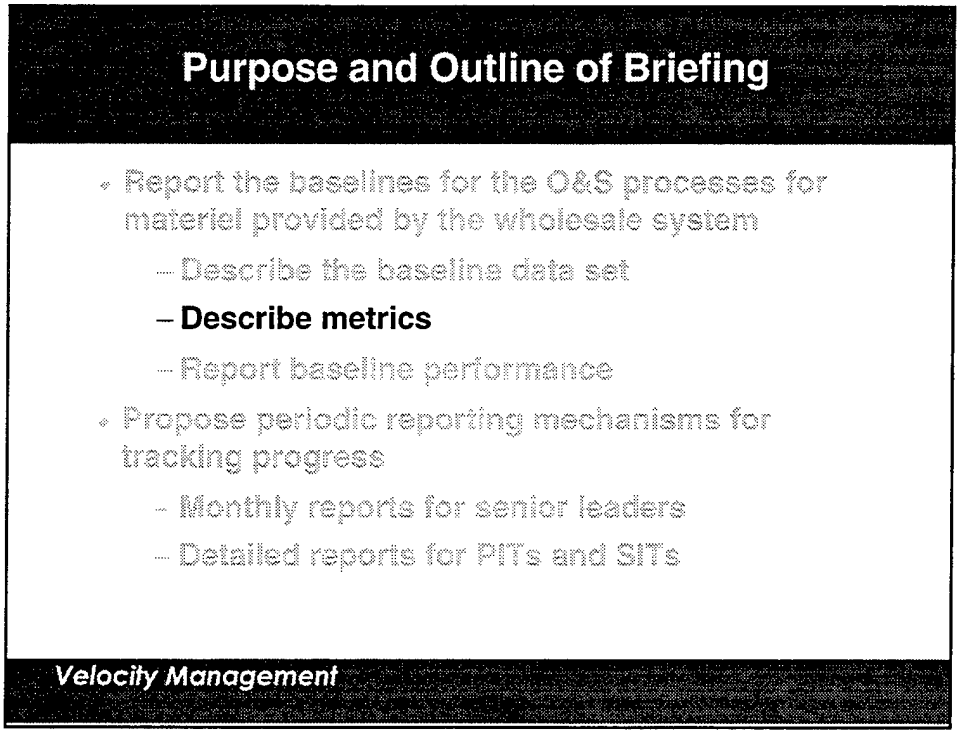
Because the baseline data set was selected based on MIRP date, every requisition has at least a document date and a MIRP date, meaning we can measure total OST.

The result of these definitions was a baseline data set of 4.9 million requisitions. The baseline data set is not a sample, but is rather the full set of requisitions meeting the defining conditions. By analyzing data on each requisition, we measured both average performance and variability. Also, we stratified the data to investigate performance by numerous selection criteria including post, component, class of supply, source of supply, etc. Finally, the baseline data set is archived, if necessary, so the data can be analyzed in additional ways in the future.

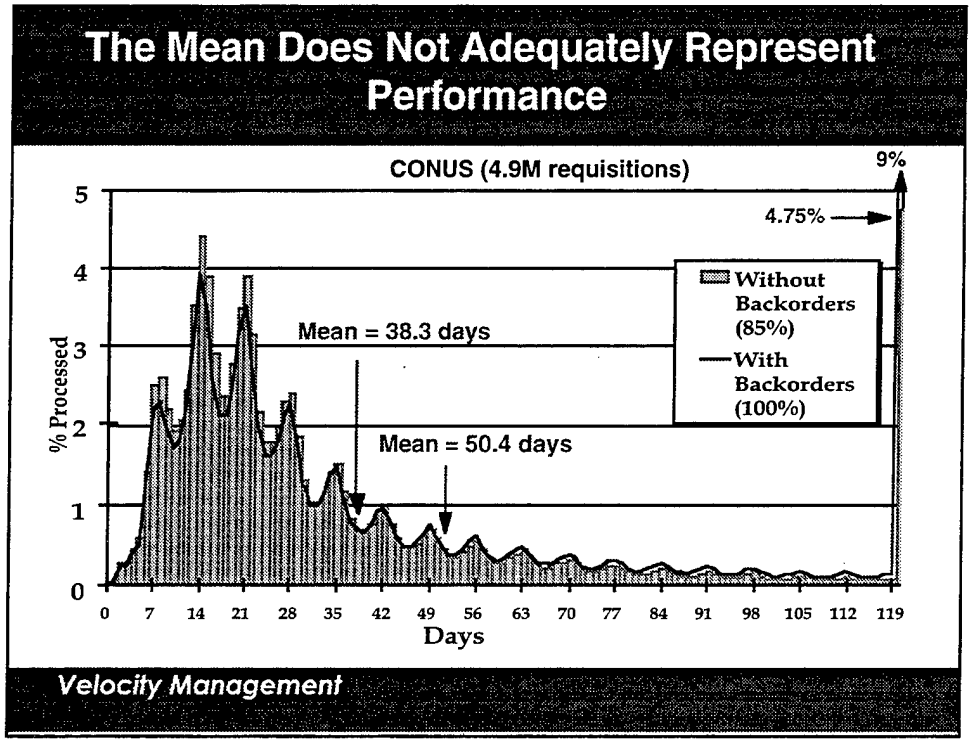
---

certain period. However, in the baseline analysis reported in this document we will list performance by segment based on the MIRP date even though the MRO may not have been cut in that period.

3. DESCRIPTION OF METRICS



Having described the baseline data set, we will now describe the metrics we used to measure OST performance. To focus process improvement efforts, the VM initiative needs metrics that evaluate both average performance and variability in performance.

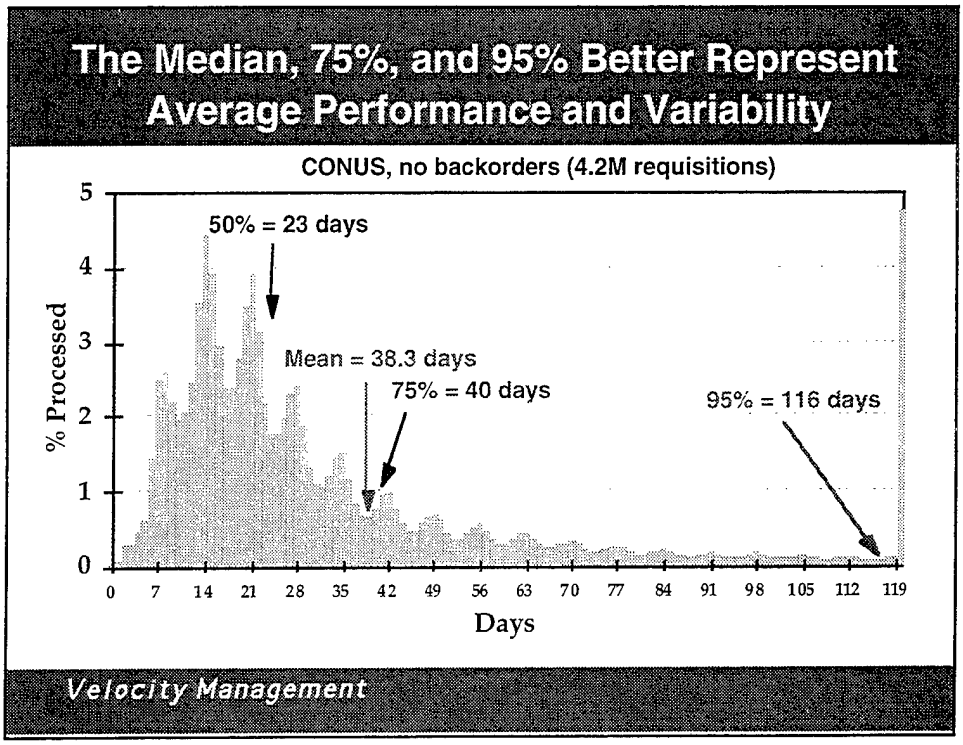


The chart above depicts the OST performance for the entire baseline data set in a format we have used in the past.[9] The X-axis is in days, and the value graphed on the Y-axis represents the percent of the requisitions for which the elapsed days from document date to MIRP date is X; that is, integrating over all X results in 100%. While providing a wealth of information, the graph of percentage requisitions filled by day is hard to describe in a succinct manner.

Two different subsets of requisitions are graphed above. The first, displayed as a line above, includes all 4.9 million requisitions in the baseline data set. The second, displayed as an area chart (actually individual bars for each day with no gaps between them), excludes backorders, which make up about 700,000 or about 15% of the overall baseline data set (i.e., the second subset is associated with the 4.2M requisitions [85%] from the baseline data set that were not backordered). With or without backorders, the resulting plots look very similar, but the means are dramatically different (50.4 versus 38.3 days). The

[9]The overall shape of the curve is best approximated as a log-normal overlaid with a sinusoid with a periodicity of seven days. Appendix C includes analysis showing that the seven-day periodicity is the result of weekends.

only major difference in the two graphs is in the extreme right tail of the X-axis. In both cases the residual tail of the curve is accumulated at 120 days. With backorders included, 9% of the requisitions take 120 days or longer, versus 4.75% with backorders excluded. If graphed, the tail of the curve with back orders included would extend much further out (i.e., there are more outliers when backordered requisitions are included). The analysis of these two fundamental subsets of the baseline data set illustrates that the mean is a poor indicator of typical performance. Also, the mean by definition is not an indicator of variability. Hence, we need more descriptive metrics.



To overcome the limitations of relying solely on the mean, we use three other metrics for OST:

1) the number of days required for 50% of the requisitions to be receipted at the SSA,
2) the number of days required for 75% of the requisitions to be receipted at the SSA, and
3) the number of days required for 95% of the requisitions to be receipted at the SSA.

The 50th percentile (median) measures performance at the midpoint of the distribution, while the 75th and 95th percentiles measure the variability or spread in performance in the right-hand tail of the distribution.[10] The mean will be retained as well because it has been a widely quoted metric and therefore provides a basis of comparison

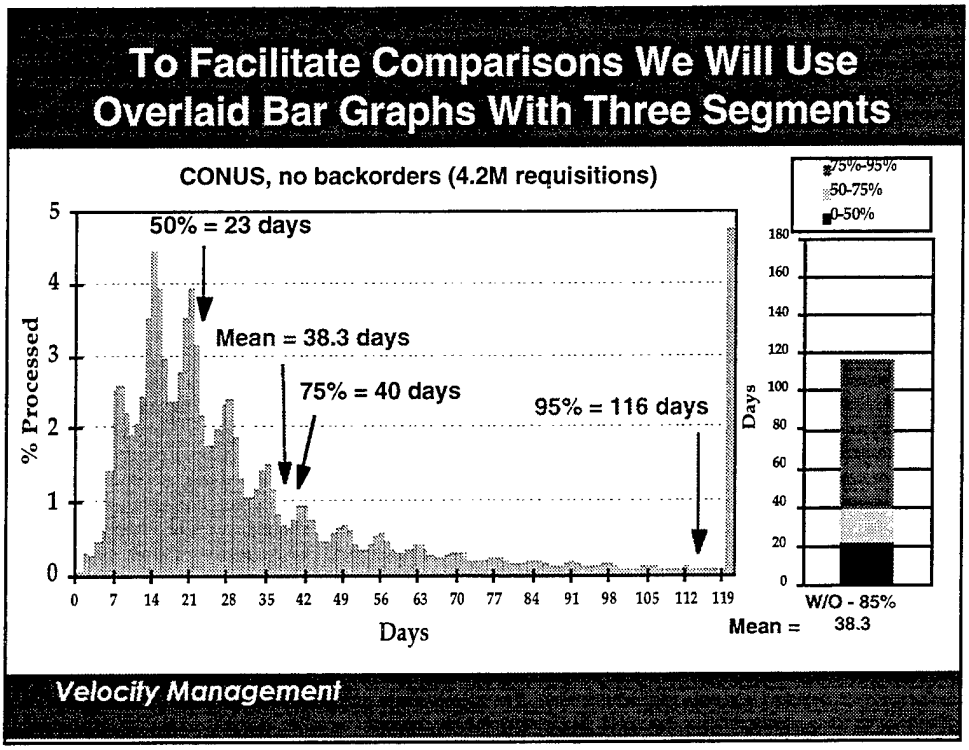
[10]We considered including both 5th and 25th percentiles as well to mirror the 75th and 95th percentile numbers (e.g., using "box and whiskers" charts). However, it was judged that software to build box and whiskers charts would be less available throughout the Army and that including the 5th and 25th percentiles might distract emphasis from the need to reduce the right-hand tail of the distribution.

with past performance.[11] We will use these same metrics to report performance for each of the segments.

Because the 95th percentile measures the right-hand tail of the distribution, which we have seen to be very long for O&S processes, increasing the final metric from the 95th to the 98th percentile would significantly increase the resulting value. We choose the 95th percentile as a good initial value. However, as process improvements are made and data quality improves, the Army may choose to increase the third metric from the 95th percentile to the 98th or 99th percentile in the future (e.g., many commercial logistics operations set standards based on the 99th percentile). Ultimately, the 100th percentile becomes the maximum OST for any requisition.

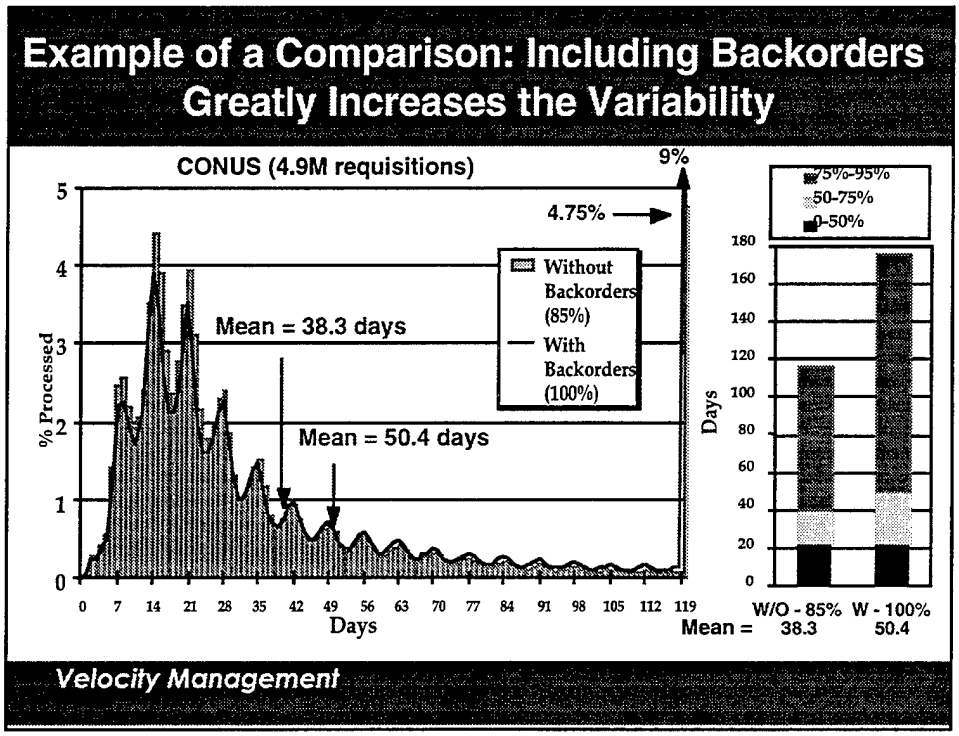
---

[11]Because the times in the LIF are currently expressed in dates, the 50th, 75th, and 95th percentiles will always be associated with an integer number of days. However, because the mean averages integer values, it need not be an integer.



To facilitate comparisons across posts and for different cuts of the data, we will depict the 50th, 75th, and 95th percentiles in a bar chart as shown on the right, listing the mean beneath the bar chart.

In the chart above, the elapsed days from document date to MIRP date for 50% of the requisitions is 23 days or less. Therefore, 23 is the height of the first segment (solid black) of the bar at the right. 75% of the requisitions have elapsed days from document date to MIRP date of 40 days or less. Therefore, 40 is the height of the second segment of the bar (light gray). Finally, 95% of the requisitions have elapsed days from document date to MIRP date of 116 days or less. Therefore, 116 is the height of the third segment (dark gray) of the bar and the overall height of the bar. Five percent of the requisitions took 116 days or longer.



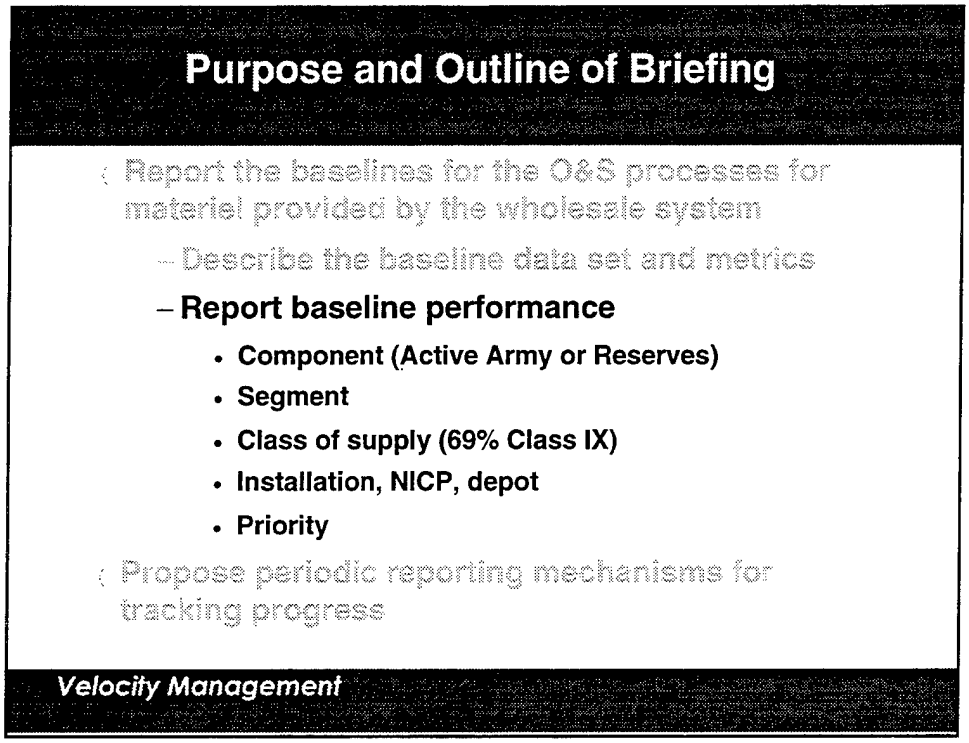
This chart compares OST both with and without backorders. The stacked bar charts are better than the means or the graphs of percentage of requisitions processed by day (on the left) in capturing the difference in performance, which is primarily in the variability. The table below summarizes the comparison depicted by the stacked bar graphs:

Population	% of total	50%	75%	95%	mean
With backorders	100%	23 days	50 days	175 days	50.4 days
Without backorders	85%	23 days	40 days	116 days	38.3 days

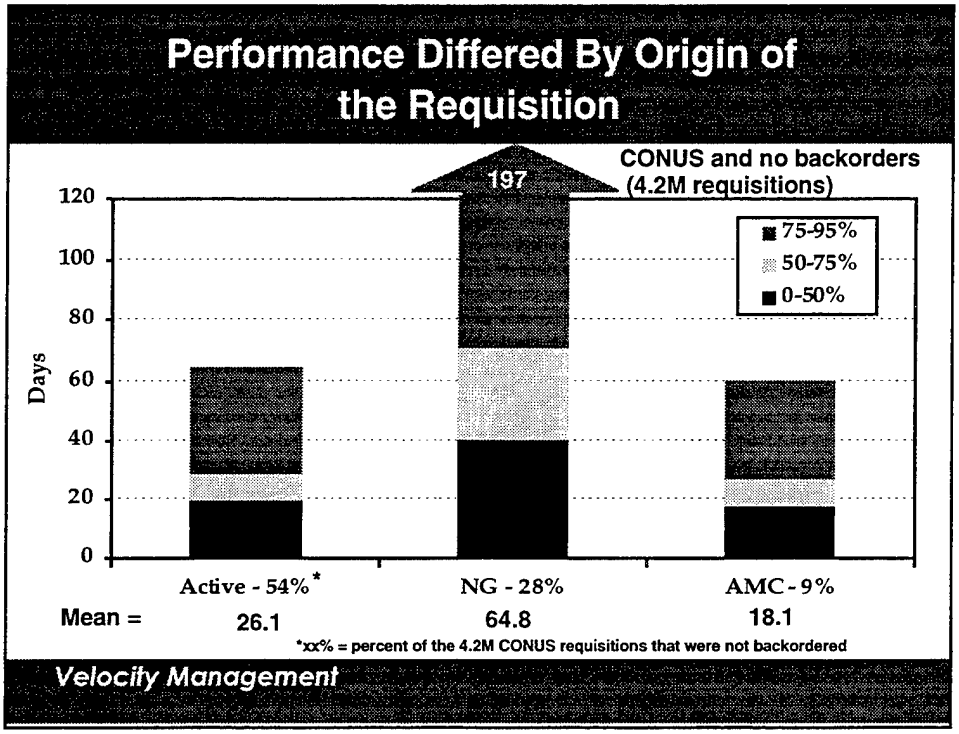
The 95th percentile of 175 days for the population of requisitions including backorders is not reflected in the chart of the distribution, which simply accumulates 9% of the requisitions at 120 days. The stacked bar chart clearly shows that the right-hand tail of the distribution extends well past 120 days.

Table A.1 in Appendix A provides the raw data for this chart on total OST as well as a breakout for each of the segments.

4. BASELINE PERFORMANCE



We have now defined both the baseline data set and the metrics and displays we will use to describe and compare performance of the order and ship processes. As we have shown, backordered requisitions typically take considerably longer (with the additional time on backorder showing up in the segment from established date to MRO cut; see Table A.1 in Appendix A). Although the customer is subjected to the delays associated with the 15% of requisitions that are backordered at the wholesale level, we will focus in this next section on the 4.2M requisitions (about 85%) in the baseline data set that were not backordered. This will allow us to focus on the steps of the distribution process and make comparisons without having to take into account to what extent differences in performance are driven by differences in backorder rates.



This chart exhibits an initial cut of the baseline data set by origin of the requisition (i.e., the component or command of the requisitioner). The percentage of the 4.2 million requisitions is listed next to the component name on the X-axis. Active Army[12] units accounted for 54% of the 4.2 million non-backordered requisitions, the National Guard accounted for 28%, AMC industrial operations (e.g., maintenance depots) accounted for 9%, and the United States Army Reserves (USAR) accounted for 3% (see Table A.2 for other requisition origins as well as detailed data by segment).

There was a significant difference in the total OST by component. The significantly worse times associated with the National Guard were attributable in part to an "unfunded" pool of requisitions which were dated by the requesting unit but held for funding at higher echelons. The result is that when funds come available, very old requisitions are often then passed on to DAAS, where the establish date is assigned. The table below breaks out the population of National Guard requisitions shown above into two subsets, one for requisitions

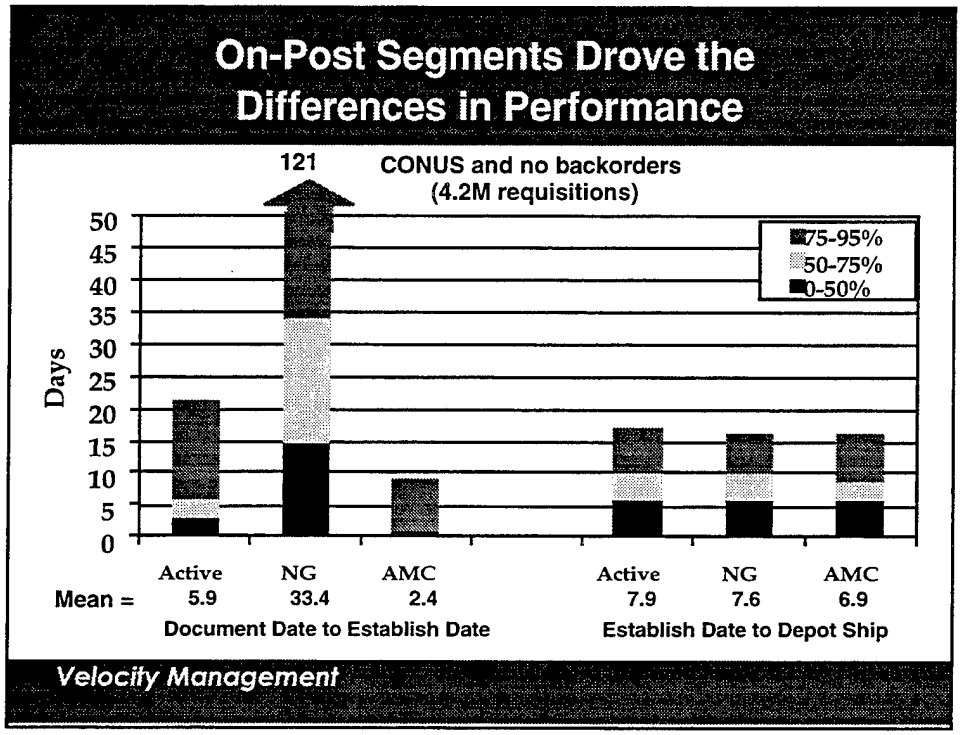
[12] We have included only FORSCOM and TRADOC units in the category "Active."

that were immediately funded and one for requisitions that were initially coded unfunded (but later funded, since they have MIRPed). (This breakout is possible because unfunded requisitions are assigned a special project code "BOH" that is captured in the LIF.)

	% of all NG requisitions	50%	75%	95%	mean
NG initially funded	78%	33 days	48 days	105 days	42.9 days
NG initially unfunded	22%	98 days	163 days	371 days	140.6 days
Total NG	100%	41 days	71 days	197 days	64.8 days
Active Army	--	20 days	29 days	64 days	26.2 days

While the OSTs for the National Guard's initially funded requisitions were still considerably slower than active and AMC, the extreme variability captured by the 75th and 95th percentiles in the chart is evidently driven by requisitions that were not initially funded.[13]

[13]The definition of "unfunded" requisitions is not uniform by state. Though funding constraints are a common reason, unfunded status may be applied to any requisitions that are more than 30 days old before being forwarded to DAAS.



This chart suggests that the primary source of the differences in OST among the three graphs in the previous chart was in the retail processes. The left-hand set of bars plots the OST metrics in the segment from document date to establish date. That is the time required to notify the wholesale system of the need for an item.[14]

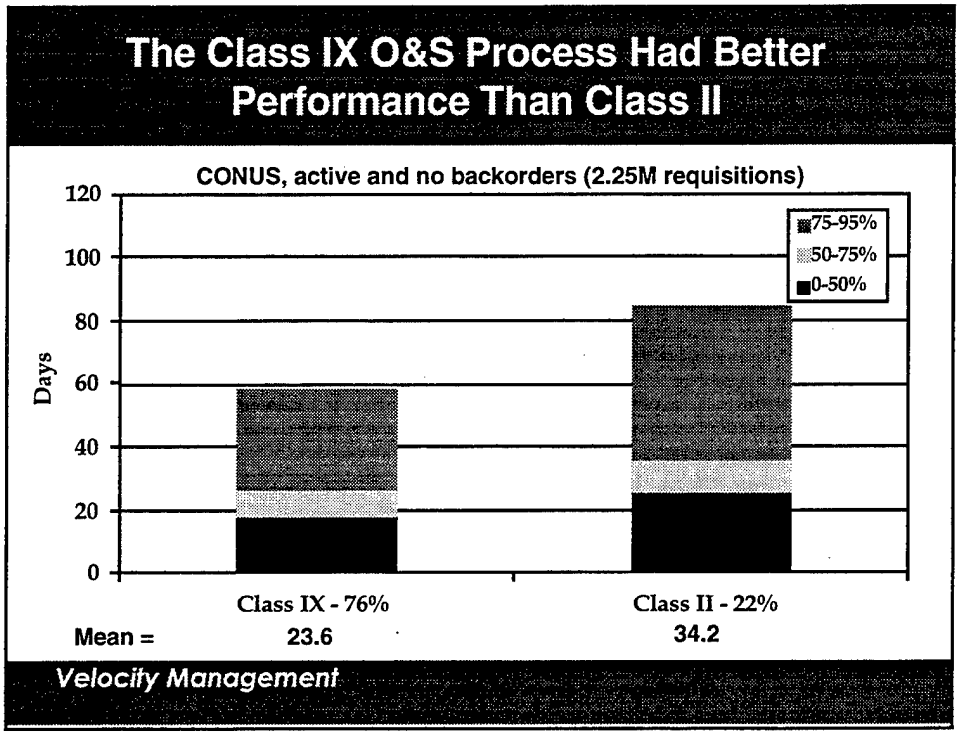
The considerably longer times in the document date to establish date segment for the National Guard, particularly for the 75th and 95th percentiles, were partly attributable to unfunded requisitions (when a requisition is unfunded it accumulates time in the document date to establish date segment until funding is found). The table below shows the times in the document date to establish date for National Guard requisitions depending on whether they were classified as funded or unfunded.

[14]The reader will note that the 75th percentile bar is not visible for AMC. This is an example where the 50th percentile and 75th percentile are equal (i.e., 1 day).

	% of all NG requisitions	50%	75%	95%	mean
NG initially funded	78%	11 days	19 days	33 days	14.6 days
NG initially unfunded	22%	62 days	108 days	297 days	98.5 days
Total NG	100%	15 days	34 days	121 days	33.4 days
Active Army	--	3 days	6 days	21 days	5.8 days

Again, while the National Guard times in the document to establish segment were considerably longer than the times for either active or AMC, the extreme variability captured by the 75th and 95th percentiles was driven by unfunded requisitions.

In contrast, the right-hand set of bars shows the times from establish date to depot ship date (combining two segments, establish to MRO and MRO to depot ship). These segments include NICP processing (back orders are not included), and depot pick, pack, and ship activities (we did not include transit times because CRP receipt was often missing for the AMC and National Guard requisitions). As can be seen above, once a requisition makes it into the wholesale system, the time required in the wholesale supply system was essentially independent of the source of the requisition.

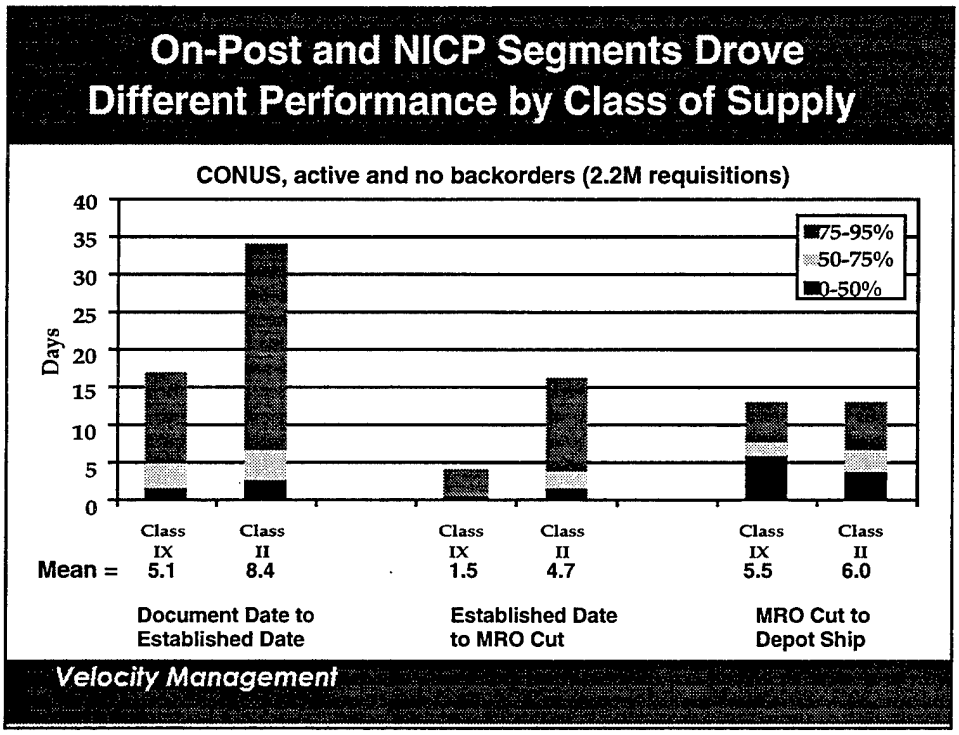


The chart above further divides the 2.25 million requisitions associated with active Army units based on the class of supply. Seventy-six percent (1.7 of 2.2 million) of all nonbackordered requisitions were for class IX. The next largest category was class II, with 490,000 requisitions (about 22%). The other classes of supply accounted for the other 2% of active Army nonbackordered requisitions.

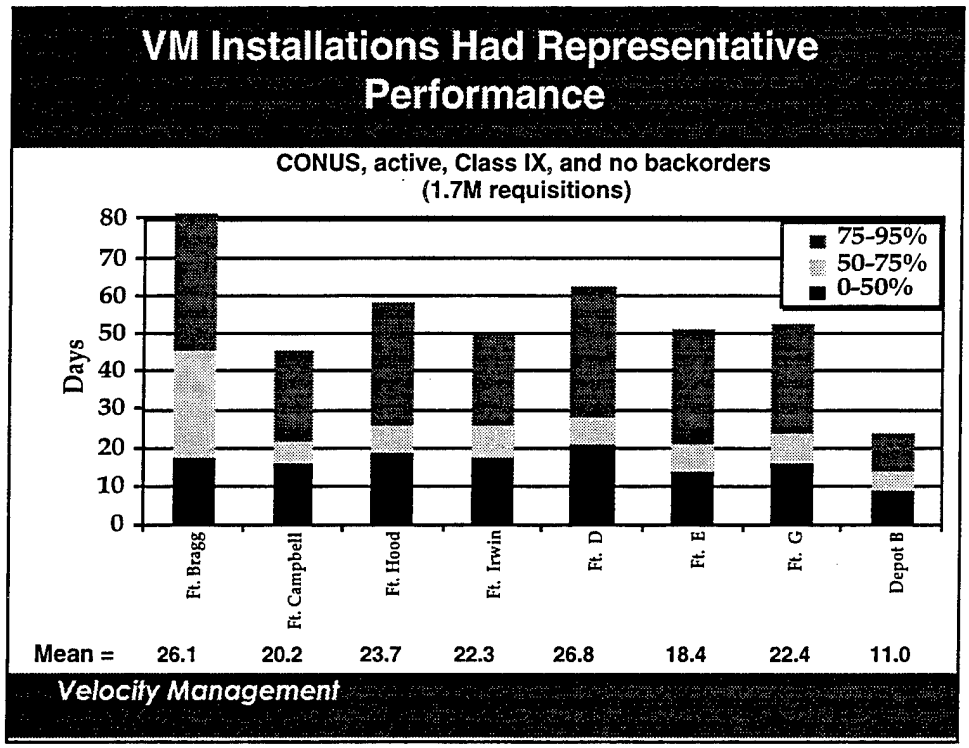
Because of differences in the associated order and ship processes, the different OSTs for classes IX and II are not surprising. For example, the class II O&S process has different standard operating procedures (SOPs) and less automation than the class IX process.

The times for the 1.7 million requisitions associated with the active (FORSCOM and TRADOC) Army units and class IX are of most interest in this analysis because this is the process "walked" by the O&S PIT in the "define" step and where the O&S PIT and SITs are focusing their initial process improvement initiatives. For this reason, in the charts that follow we will focus on the 1.7 million nonbackordered class IX requisitions from active (FORSCOM and TRADOC) units. The O&S PIT plans to "walk" the class II requisition process,

and further stratifications of the baseline data set are also planned (see the discussion of future work on page 39).



This chart illustrates that the slower OST for class II requisitions was a result of the slower and usually more variable times in the document to establish (getting the requisition off post) and the establish to MRO cut (NICP processing) segments.

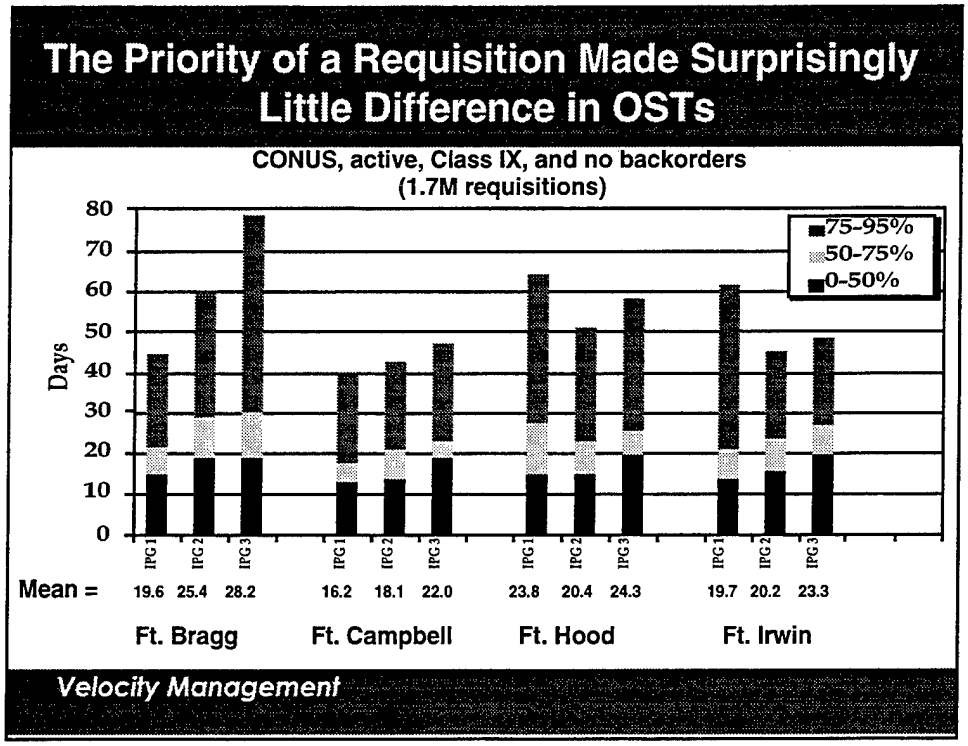


The data in this chart represent the class IX, nonbackordered requisitions by originating installation (shown on the X-axis). All but the AMC depot on the far right are also limited to active Army requisitions associated with the resident command (e.g., FORSCOM requisitions at a FORSCOM post). Velocity Management was initially being implemented at four installations: Ft. Bragg (152,000 requisitions), Ft. Campbell (107,000), Ft. Hood (340,000), and Ft. Irwin (70,000). Overall, the four posts represented 39% (670,000) of the 1.7 million active Army, class IX, nonbackordered requisitions. Hence, the four VM posts engaged in the initial implementation of VM represented a substantial commitment by the Army's senior logistics leadership. Also, many of the process improvements will affect OSTs at other posts and even other services (e.g., efforts in the wholesale segments of the order and ship process).

There were unique conditions during the baseline year at each of the VM posts. For example, Ft. Hood was under a single stock fund test that added a couple of days to all its requisitions (in the establish to MRO segment), and Ft. Bragg was converting over to Standard Army Retail Supply System-Objective (SARSS-O), the Army's new supply automation system, resulting in several

spikes in OST associated with pseudoreceipts as the units worked to balance their accountable records (in the DSU receipt to MIRP segment). However, for the baseline period, the four VM installations had representative performance.[15] See Table A.4 for more detailed OST data on each of the VM posts.

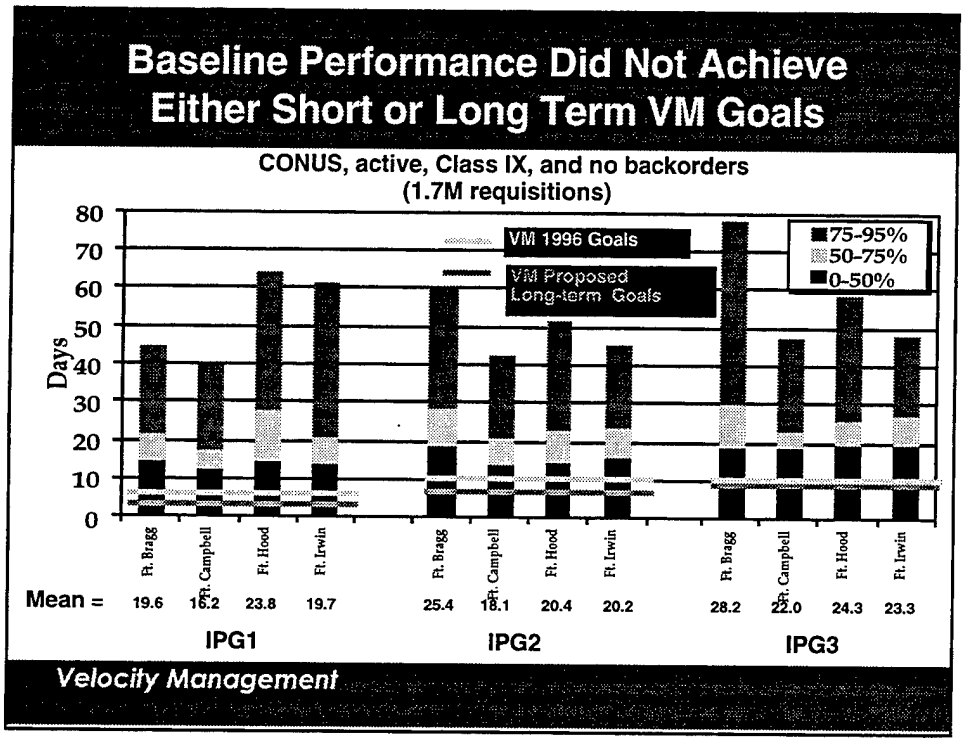
[15] The data for non-VM posts D, E, and G are presented only for comparison. The VM posts were not particularly different in their performance compared to these other posts.



This chart breaks out the nonbackordered class IX requisitions from active units at each of the VM posts by issue priority group (IPG).[16] The chart suggests that priorities have less effect on total OSTs than is usually assumed. While the median performance consistently shows some marginal improvement, the 75th and 95th percentiles were not consistently lower for higher-priority requisitions. (See Tables A.5 to A.7 for the data by segment.)

---

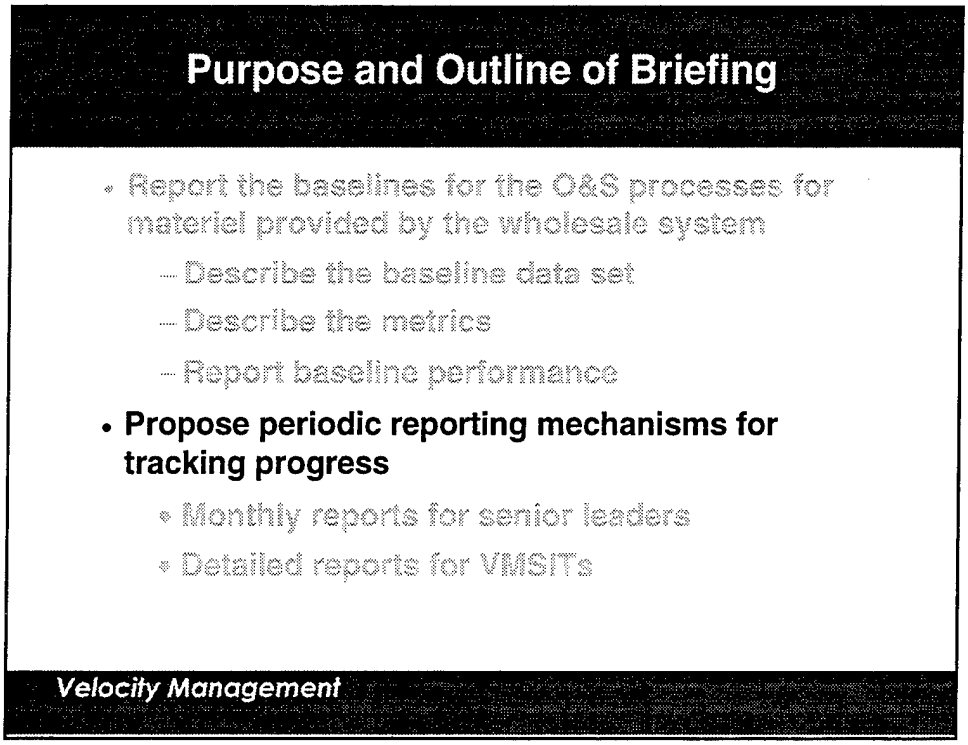
[16]Issue priority groups are defined as follows: IPG1 (Issue Priority Designators 01-03), IPG2 (04-08), and IPG3 (09-15).



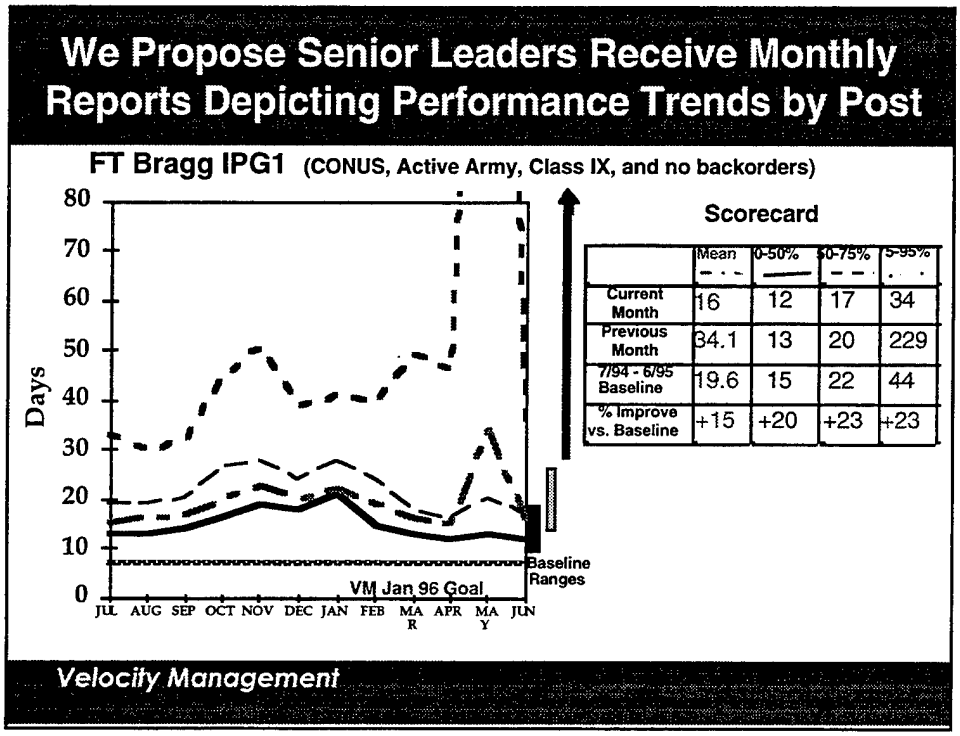
This chart breaks out the nonbackordered class IX requisitions by active units at each of the VM posts by priority and compares them to both interim and long-term VM goals for OST.[17] The VM goals are maximum times for every requisition. Hence the 95% bar (i.e., the overall height of each bar) will, when these goals are achieved, be below the lines associated with the goals.

[17]The proposed long-term VM goals were presented to the Army's logistics leadership by the O&S PIT in the June 1995 draft report, "Reengineering the Army's Order and Ship Process." The 1996 VM goals are derived from a September 1995 memorandum signed by then-LTG Johnnie Wilson, DCSLOG.

5. PROPOSED PERIODIC REPORTING MECHANISM



Because effective reporting of OST performance provides important information both to senior leaders and to those charged with improving O&S performance locally, the final section of this briefing proposes reporting mechanisms to meet their needs.



This chart proposes a format for charting the progress of posts. Our example here reports Ft. Bragg IPG1 requisitions.[18] As stated in the beginning of this briefing, OSTs are not stationary across time. That is why we used data for a full year to establish the baseline. However, the dimension of time is critical in reporting and tracking progress on efforts to reduce OSTs.

The chart above plots the mean, median, 75th percentile, and 95th percentile for all requisitions that MIRP in the month shown on the X-axis. We have included the twelve months associated with the baseline data set in the chart. That is, when charting over time, we have moved from twelve segmented bars, one for each month (along with a mean), to a line chart with four lines. The heavy lines to the right of the line chart depict the range for the monthly 50th, 75th, and 95th percentiles during the baseline period. These also highlight the fact that in any given month there is considerable variability in the OST metrics.

---

[18]In May, Ft. Bragg had pseudoreceipts that resulted in anomalies in the OSTs which we could not filter out.

The line at the bottom of the chart represents the interim (January 1996) VM CONUS goal for IPG1 OSTs. To reach the goal, the lines for each metric (in particular, the line associated with the 95th percentile) will have to fall below the line associated with the goal.

As a further mechanism for reporting progress, a "scorecard" is included on the right of the chart. The scorecard is a table that includes the metrics (mean, 50th, 75th, and 95th percentiles) for the most recent two months, the baseline calculated over the year from July 1994 to June 1995, and the percent improvement from the most recent month compared to the average baseline for each of the metrics.

As data for a new month become available, the oldest month would "fall off" the chart on the left and the new month would be "added" on the right. That is, each month the chart could retain twelve months but "shift" to the right. However, the ranges over the baseline period to the right of the chart will not change, nor will the numbers for the July 1994 to June 1995 baseline in the third row of the scorecard.

The monthly charts and scorecards for the other VM posts and priorities are included in Appendix B, along with the more detailed data sheets.

LOGSA has been producing and disseminating monthly reports for the VM posts since August 1995. Reports for other posts will be added as VM implementation proceeds.

VM SITs Would Receive More Timely and Detailed Reports

Tracking on a weekly basis by segment would allow VM SITs to

- **Quickly understand effect of interventions**
- **Provide incentives for improved performance**

Monthly reports based on MIRP date

Monthly and weekly reports would be broken out by SSA

Add other information needed to help the SITs diagnose performance drivers

- **Reports on outliers**
- **Electronic extracts**

Velocity Management

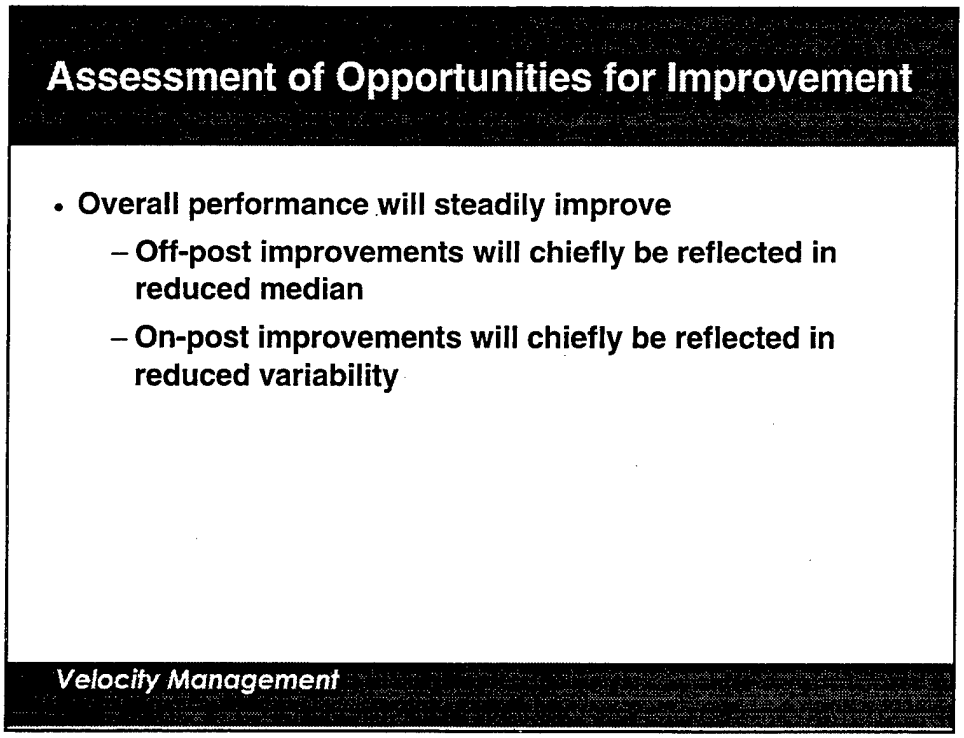
The VM SITs are handling the day-to-day process analysis and improvement tracking at the local level. Monthly reports of the full O&S cycle are important and useful to them. However, they need more timely (e.g., weekly) and precise (e.g., segment-by-segment) data if they are to aggressively lead the improvement efforts for their customers. Under current implementation guidance, the SITs receive two sets of reports from LOGSA. The first is a weekly report broken out by segment. Segment metrics will be calculated based on all the requisitions that closed that segment in the previous week. For example, all requisitions that have an establish date in the previous week would be used to generate the mean, median, 75th percentile, and 95th percentile times for the segment from document date to establish date.

The monthly reports, like the calculations in this document for the baseline data set, are based on MIRP date. This, as already discussed, provides a consistent population of requisitions across the different segments and allows the monthly results to be appended directly to the existing monthly line charts.

For both the monthly and weekly reports, the SITs are receiving OST measurements for individual SSAs (and associated customer DODAACs) to help

identify performance drivers. SITs would also request reports on individual document numbers that were outliers or electronic extracts of the LIF data for their own analysis directly from LOGSA.

Later, LOGSA plans to implement LIF-MOD, which would allow users to access LIF data directly and provide a user interface for common graphics, reports, and data extracts.



The Army has seen steady progress in reducing order and ship times as many process changes already identified are implemented. Improvements in both median performance and variability have occurred in all segments of the process. However, based on our analysis of the baseline data set, we look to the retail segments (document date to establish date, and CRP receipt to MIRP) for the greatest opportunity to reduce the variance (75th and 95th percentiles). The retail segments are where most of the extreme outliers (for nonbackordered requisitions) are currently generated and where the current variance is the highest. The wholesale segments will provide opportunities for steady improvements in typical performance (the 50th percentile). The wholesale segments are less variable but account for a large percentage of the time that is reflected in the OST of each requisition and captured in the median metric.

O&S PIT Is Expanding the Application of the VM Methodology

While the O&S PIT initially focused on OST for class IX wholesale requisitions at the four VM posts

- **Process changes in the wholesale segments may affect all Army and even other service OSTs**
- **Other posts are likely to implement successful O&S process improvements and be added to VM**
- **ILAP data is being used to evaluate retail OSTs**

Baselines and SITs are being developed to apply VM to

- **The National Guard and USAR**
- **Other classes of supply**
- **OCONUS units**

Work proceeds to develop metrics and baselines for other dimensions of performance like quality and cost

Velocity Management

Work to date by the O&S PIT has focused primarily on the O&S process for the four VM posts. Also, this work has been further focused on requisitions filled from wholesale supply associated with active Army units, for non-backordered class IX material. Although it is a significant implementation, this focus is quite limited in terms of improving overall Army OSTs. For example, as shown earlier in this document, this focus reduced the number of requisitions from the baseline data set as summarized in the table below:

All requisitions in the CONUS baseline data set:	4.9 million
Minus 15% (700k) of requisitions that are backordered:	4.2 million
Minus 47% (2M) of requisitions not from active FORSCOM and TRADOC units:	2.2 million
Minus the 24% of requisitions that are not class IX:	1.7 million
Minus the (1M) requisitions not from VM posts:	690 thousand

However, the effects of process changes will be more widespread than the table suggests. For example, changes to the wholesale segment can affect all

Army and even other service requisitions. Also, other posts will most likely implement successful O&S process improvements as they become aware of them, and eventually all Army units will be included in the ongoing improvement programs.

The above does not include the 1.5M OCONUS wholesale requisitions during the baseline period, or the millions of requisitions that were satisfied locally before reaching the wholesale level (most of these eventually resulted in replenishment requisitions for retail inventories).

The O&S PIT is working on expanding the focus of VM to include other sources of requisitions (beyond FORSCOM and TRADOC units), other classes of supply, and OCONUS units. We are also working with Integrated Logistics Analysis Program (ILAP) data to measure OST for requisitions filled from retail supply sources (e.g., ASL, PLL, and shop stock).

APPENDIX A: ANALYSIS OF SELECTED ATTRIBUTES

This appendix provides more detailed data tables for each of the populations of requisitions analyzed in the first section of the briefing on establishing a baseline. The titles and headings on the tables describe the population of requisitions included in the analysis. For example, Table A.1 is based on all 4,914,538 requisitions in the baseline data set. Each row of the table describes a different subset of the data. In this case, the first row is the entire population; the second row population is restricted to the 4,202,055 requisitions that were never in backorder status at the wholesale level (as determined by the backorder indicator in the LIF). The first six data columns break out the overall OST by the six segments that can be measured from the seven dates in the LIF (for a more detailed description of each of these segments, see the main body of the document). The following abbreviations are used: (1) Doc is document date, (2) Est is establish date, (3) MRO is MRO cut date, (4) Dep is depot ship date, (5) CRP is CRP receipt date, (6) DSU is DSU receipt date, and (7) MIRP is master inventory record posting, which is the date that the SSA accountable record logs the receipt. Two additional combined segments are included in the tables. The first is Doc -> MIRP, which estimates the overall OST based on the first and last dates available in the LIF. The second is Dep->MIRP, which is the elapsed days from depot ship to MIRP and combines the last three segments available from the LIF. We provide this segment because both CRP receipt and DSU receipt may be missing due to a lack of source data automation. Also, depending on the command or component of the requisitioner, these dates may not be collected (e.g., AMC depots may not have an activity corresponding to DSU receipt).

Within each segment or combined segments there are six columns of data. The first "N" lists how many requisitions were included in the measurement of this segment for the subset associated with the row. To be included, a requisition must have valid dates at each endpoint of the segment. Hence a requisition is not included if either date is missing or if elapsed days are negative (dates for sequential segments should be chronologically consistent). The next column, "%MS," lists the percent of the total subset that is missing. Because

each requisition must have a document date and a MIRP date to be in the baseline data set, the "N" from the Doc->MIRP segment has the total number of requisitions in the subset associated with a given row (the subset being taken from the population described in the table heading, which may restrict the population analyzed to a subset of the overall baseline data set). The "Mean" column lists the mean elapsed days for the segment. The "50%" column lists the number of days required for 50% of the requisitions to complete the segment. The "75%" and "95%" columns are defined in a similar manner.

The 50%, 75%, and 95% numbers listed in the tables are the basis of the bar charts presented in this document (and the corresponding mean is listed below the bar chart). For bar charts for overall OST, use the data in the Doc->MIRP column. Where individual segments are broken out, the data comes from the appropriate segment or combined segments (which are not always listed in these tables). One must exercise caution when combining segments in these tables. Because of data availability, the "N" associated with different segments is usually different, implying the metrics are based on different subsets. Also, it is incorrect to sum the 50th, 75th, and 95th percentiles across segments.

We refrain from discussing the results in the tables in this appendix. The analysis in the body of the document has graphs and discussions highlighting the differences across different segments. Future documents will analyze the different populations of the requisitions and segments in more detail. These tables are provided to widely disseminate the baseline results. This should allow SITs to more carefully track their progress based on their periodic reports from LOGSA.

TABLE A.1: ALL REQUISITIONS WITH/WITHOUT BACKORDERS

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Including Backorders	4913303	0	14.9	4	13	58	4287210	13	12.7	1	2	68	4175070	15	5.6	5	7	14	1607819	67	5.5	5	7	13
No Backorders	4200951	0	14.6	4	13	57	3797504	10	1.9	1	1	5	3698527	12	5.6	5	7	13	1424386	66	5.4	5	7	13

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Including Backorders	1048226	79	3.0	0	1	8	1051411	79	5.7	1	5	20	4914538	0	50.4	26	50	178	4754294	3	16.4	9	16	53
No Backorders	927649	78	3.1	0	1	8	930209	78	5.7	1	5	20	4202055	0	38.3	23	40	116	4068294	3	16.0	9	15	50

TABLE A.2: BY COMMAND CODE

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders

Command	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
FORSCOM	1862891	0	5.7	3	6	20	1738357	7	2.2	1	2	7	1702422	9	5.7	5	8	13	1041173	44	5.3	5	7	12
TRADOC	391253	0	6.5	2	6	29	328206	16	1.6	1	1	6	322734	18	4.8	3	7	13	109285	72	7.0	5	8	21
NGB	1188061	0	33.4	15	34	121	1082338	9	1.7	1	1	4	1059047	11	5.6	5	7	14	130701	89	5.2	5	6	11
USAMC	365745	0	2.4	1	1	9	309831	15	1.6	1	1	4	281089	23	4.9	3	7	14	34639	91	5.2	5	6	12
RESERVE	115491	0	43.6	22	47	156	80349	30	2.1	1	2	11	78327	32	6.0	5	7	14	17206	85	6.0	5	7	15
ROTC (FORSCOM)	46205	0	7.9	3	6	28	42838	7	1.9	1	1	5	41903	9	6.1	5	8	13	29442	36	5.0	4	6	11
ROTC (TRADOC)	42448	0	29.7	14	34	114	41859	1	1.4	1	1	3	41523	2	5.0	4	7	11	10098	76	4.7	5	5	8

Command	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
FORSCOM	808409	57	2.7	0	1	6	810897	56	5.4	1	5	19	1863222	0	26.0	20	28	63	1817855	2	12.1	8	13	34
TRADOC	52197	87	3.7	0	1	13	52197	87	5.9	1	4	25	391276	0	26.8	20	30	70	381018	3	13.3	9	14	36
NGB	14427	99	16.8	0	13	82	14427	99	7.2	1	7	35	1188470	0	64.8	41	71	197	1155838	3	23.3	13	23	81
USAMC	5639	98	9.2	1	7	49	5639	98	12.1	4	12	38	366079	0	18.1	14	20	42	330244	10	9.5	6	9	20
RESERVE	3860	97	12.9	0	1	65	3860	97	18.5	5	18	61	115492	0	79.1	56	90	223	110506	4	26.8	16	32	78
ROTC (FORSCOM)	22038	52	2.0	0	1	5	22082	52	4.5	1	4	14	46205	0	31.2	20	28	89	45115	2	15.2	7	11	46
ROTC (TRADOC)	1444	97	4.6	0	2	14	1445	97	6.9	1	4	46	42448	0	70.1	47	87	213	42065	1	34.0	18	40	128

TABLE A.3: ACTIVE ARMY BY CLASS OF SUPPLY

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95 Active Army, No Backorders

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
SupClass	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Class 9	1705478	0	5.1	2	5	17	1689209	1	1.5	1	1	4	1660085	3	5.5	4	7	13	922371	46	5.2	4	6	12
Class 2	490382	0	8.4	3	7	34	334822	32	4.7	2	4	16	323858	34	6.0	6	8	13	199332	59	6.6	5	7	17

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
SupClass	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Class 9	723433	58	2.1	0	1	6	725543	57	5.1	1	5	18	1705798	0	23.6	18	26	58	1675130	2	11.4	8	12	32
Class 2	118462	76	6.0	0	1	20	118784	76	7.5	2	6	24	490405	0	34.2	25	36	84	468811	4	15.3	10	16	42

TABLE A.4: BY BASE (SUPPLY CLASS 9)

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Base	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	151784	0	7.8	2	6	35	150829	1	1.4	1	1	3	148598	2	5.5	4	7	14	135982	10	3.4	3	5	8
Campbell	107219	0	4.4	3	5	11	105425	2	1.7	1	1	3	103626	3	5.3	4	7	13	64591	40	4.7	4	6	10
Hood	340499	0	4.5	2	4	13	338727	1	2.6	1	3	7	332925	2	6.0	5	8	13	241641	29	5.0	5	6	11
Irwin (NTC)	69982	0	3.0	2	4	8	69406	1	1.4	1	1	3	67773	3	6.1	5	8	14	56726	19	10.0	9	13	21

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Base	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	124939	18	2.6	1	3	10	126907	16	6.1	2	6	20	151784	0	26.1	18	28	70	149329	2	11.3	8	12	25
Campbell	50423	53	0.8	0	0	1	50423	53	3.6	1	3	16	107219	0	20.2	16	22	45	105321	2	8.8	6	9	25
Hood	188408	45	2.3	1	2	5	188408	45	4.1	1	4	19	340695	0	23.7	19	26	58	334577	2	10.6	8	12	32
Irwin (NTC)	21880	69	1.1	0	0	10	21882	69	0.9	0	0	0	69982	0	22.3	18	26	49	68292	2	11.7	9	13	25

TABLE A.5: PRIORITY GROUP P1-3

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority and Base

Base	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	28852	0	4.2	2	4	16	28698	1	1.1	1	1	3	28175	2	4.2	2	5	13	25384	12	2.8	2	4	7
Campbell	24030	0	4.0	3	5	11	23640	2	1.4	1	1	4	23028	4	2.8	2	3	10	14046	42	3.8	3	5	7
Hood	69934	0	4.5	2	5	14	69580	1	2.6	1	3	11	68243	3	4.1	2	5	12	44389	37	3.6	3	5	9
Irwin (NTC)	11461	0	3.1	2	4	9	11370	1	1.3	1	1	3	11154	3	3.4	2	4	11	8239	28	8.1	7	10	18

Base	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	23400	19	2.3	0	3	10	24025	17	5.7	2	6	16	28852	0	19.6	15	22	44	28286	2	10.2	7	11	23
Campbell	11934	50	0.8	0	0	0	11934	50	3.5	1	3	15	24030	0	16.2	13	18	40	23404	3	8.0	5	8	27
Hood	33938	52	2.2	1	2	5	33938	52	6.2	1	6	29	69998	0	23.8	15	28	64	68613	2	12.8	7	14	45
Irwin (NTC)	3717	68	0.6	0	0	2	3717	68	1.1	0	0	0	11461	0	19.7	14	21	61	11241	2	11.6	7	11	44

TABLE A.6: PRIORITY GROUP P4-8

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority and Base

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Base	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	24600	0	7.3	3	7	32	24441	1	1.2	1	1	3	24078	2	5.5	4	7	15	21471	13	3.4	3	5	8
Campbell	15192	0	4.4	3	5	12	14960	2	1.5	1	1	4	14715	3	3.9	2	5	12	9340	39	4.1	4	5	8
Hood	45767	0	4.0	2	4	13	45517	1	2.6	1	2	7	44856	2	4.8	4	7	12	31086	32	4.1	3	6	10
Irwin (NTC)	9578	0	2.9	2	4	7	9503	1	1.2	1	1	3	9304	3	4.7	3	7	13	7750	19	9.2	8	12	21

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Base	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	19796	20	2.6	1	3	10	20183	18	6.1	2	7	21	24600	0	25.4	19	29	60	24185	2	11.3	8	13	26
Campbell	7718	49	0.8	0	0	1	7718	49	3.7	1	3	24	15192	0	18.1	14	21	42	14933	2	8.4	6	8	33
Hood	25424	44	2.2	1	2	5	25424	44	3.9	1	4	17	45792	0	20.4	15	23	51	45109	1	9.1	7	10	27
Irwin (NTC)	3503	63	0.8	0	0	4	3503	63	1.2	0	0	0	9578	0	20.2	16	24	45	9378	2	11.0	8	12	27

TABLE A-7: PRIORITY GROUP P9-15

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority and Base

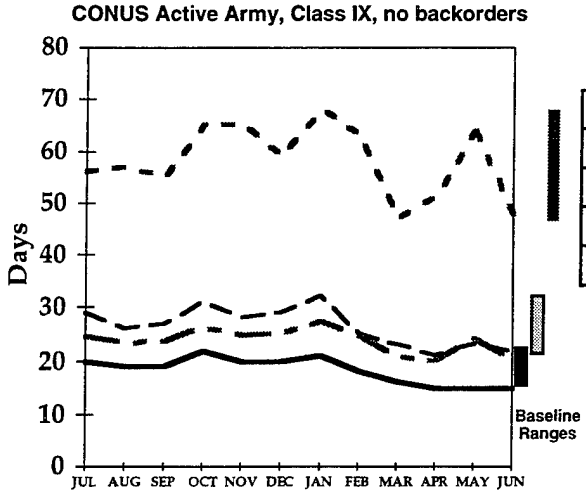
Base	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	98322	0	9.0	3	6	40	97690	1	1.5	1	1	3	96345	2	5.9	5	7	15	89127	9	3.5	3	5	9
Campbell	67997	0	4.6	3	6	11	66825	2	1.8	1	1	3	65883	3	6.5	6	9	13	41205	39	5.2	5	7	11
Hood	224798	0	4.5	2	4	13	223630	1	2.7	1	3	6	219826	2	6.9	6	8	14	166166	26	5.5	5	7	12
Irwin (NTC)	48943	0	2.9	1	3	9	48533	1	1.4	1	1	3	47315	3	7.0	6	9	15	40737	17	10.6	10	13	22

Base	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
Bragg	81743	17	2.7	1	3	10	82699	16	6.2	2	7	20	98332	0	28.2	19	30	78	96858	2	11.6	8	13	25
Campbell	30771	55	0.8	0	0	3	30771	55	3.6	1	3	15	67997	0	22.0	19	23	47	66984	1	9.2	7	10	23
Hood	129046	43	2.3	1	2	5	129046	43	3.6	1	3	14	224905	0	24.3	20	26	58	220855	2	10.3	8	11	28
Irwin (NTC)	14660	70	1.3	0	0	13	14662	70	0.8	0	0	0	48943	0	23.3	20	27	48	47673	3	11.9	10	14	24

APPENDIX B: ANALYSIS BY POST BY MONTH

The purpose of this appendix is to document for active Army and each of the VM posts the monthly tracking through the baseline period. Charts are included for overall and by IPG. These charts can be (and have been) made available electronically via the Internet to the SITs. The SITs are updating the charts with new data based on the monthly reports they receive from LOGSA. The data tables for each VM post are also included after the charts to help the SITs understand monthly performance by segment during the baseline period of July 1994 to June 1995.

CONUS Active Army, Class IX, No Backorders
1 July 94 - 30 June 95

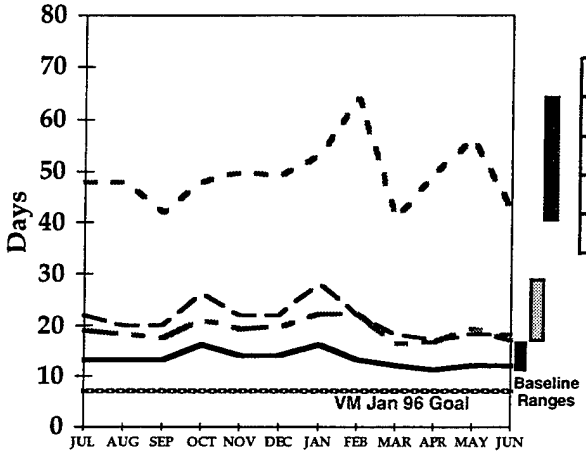


Scorecard

	Mean	Median	75%	95%
Current Month	20.2	15	22	48
Previous Month	24.3	15	23	64
Baseline Average	23.6	18	26	58
% Improv vs. Baseline	+14	+17	+15	+17

Velocity Management

CONUS Active Army, IPG1, Class IX, No Backorders
1 July 94 - 30 June 95

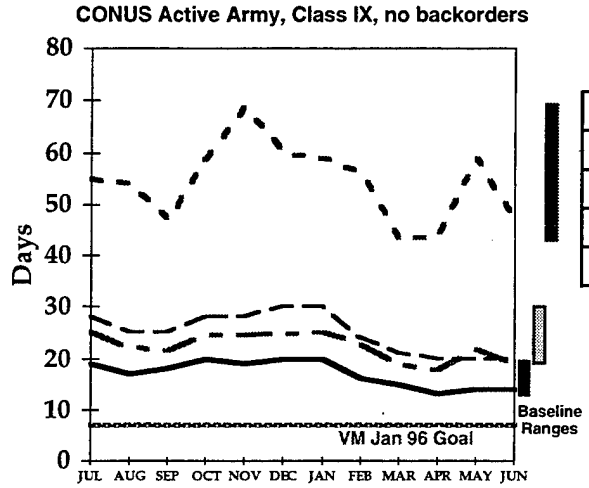


Scorecard

	Mean	Median	75%	95%
Current Month	16.8	12	18	42
Previous Month	19.4	12	18	56
Baseline Average	18.9	13	21	50
% Improv vs. Baseline	+11	+8	+14	+16

Velocity Management

CONUS Active Army, IPG2, Class IX, No Backorders
1 July 94 - 30 June 95

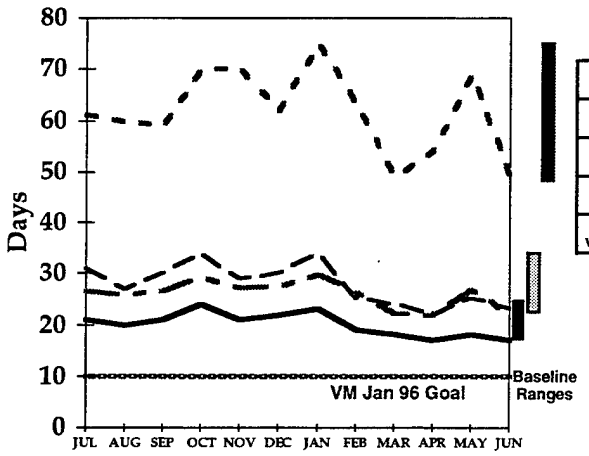


Scorecard

	Mean	Median	75%	95%
Current Month	18.7	14	20	47
Previous Month	21.8	14	20	59
Baseline Average	22.1	16	25	55
% Improv vs. Baseline	+15	+13	+20	+15

Velocity Management

CONUS Active Army, IPG3, Class IX, No Backorders
1 July 94 - 30 June 95



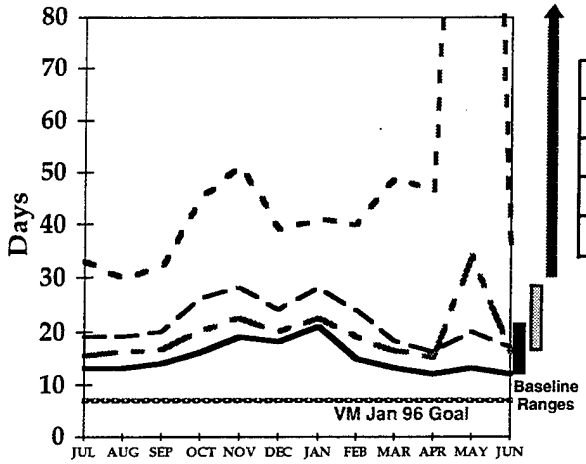
Scorecard

	Mean	Median	75%	95%
Current Month	21.8	17	23	49
Previous Month	26.9	18	25	69
Baseline Average	25.7	20	28	62
% Improv vs. Baseline	+15	+15	+18	+21

Velocity Management

Monthly Report for Ft. Bragg
IPG1 Requisitions

CONUS Active Army, Class IX, no backorders



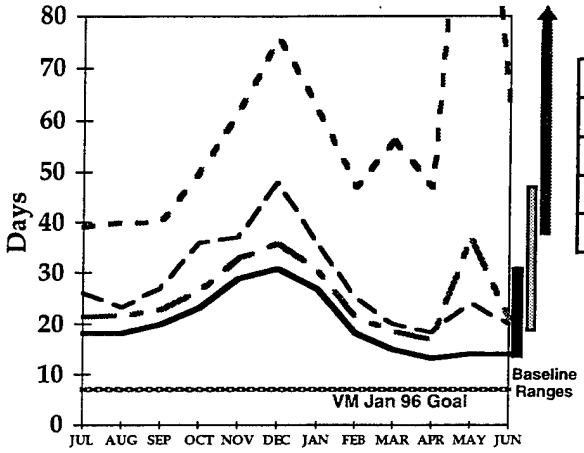
Scorecard

	Mean	Median	75%	95%
Current Month	16.0	12	17	34
Previous Month	34.1	13	20	229
Baseline Average	19.6	15	22	44
% Improv vs. Baseline	+18	+20	+23	+23

Velocity Management

Monthly Report for Ft. Bragg
IPG2 Requisitions

CONUS Active Army, Class IX, no backorders



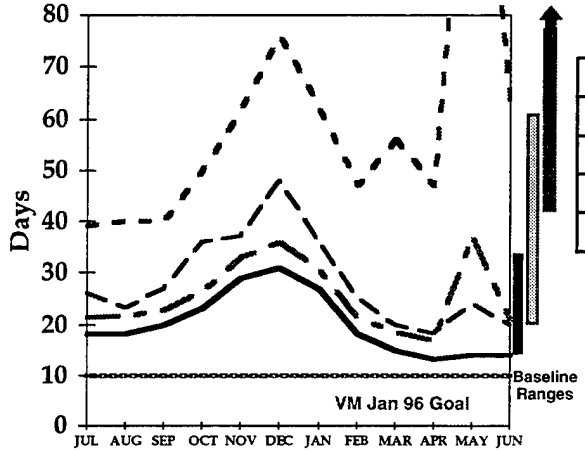
Scorecard

	Mean	Median	75%	95%
Current Month	21.0	14	20	62
Previous Month	37.3	14	24	137
Baseline Average	25.4	19	29	60
% Improv vs. Baseline	+17	+26	+31	-3

Velocity Management

Monthly Report for Ft. Bragg
IPG3 Requisitions

CONUS Active Army, Class IX, no backorders



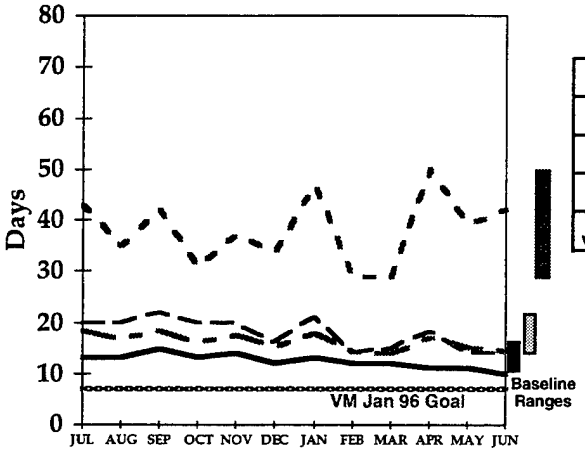
Scorecard

	Mean	Median	75%	95%
Current Month	21.0	14	20	62
Previous Month	37.3	14	24	137
Baseline Average	28.2	19	30	78
% Improv vs. Baseline	+26	+26	+33	+21

Velocity Management

Monthly Report for Ft. Campbell
IPG1 Requisitions

CONUS Active Army, Class IX, no backorders



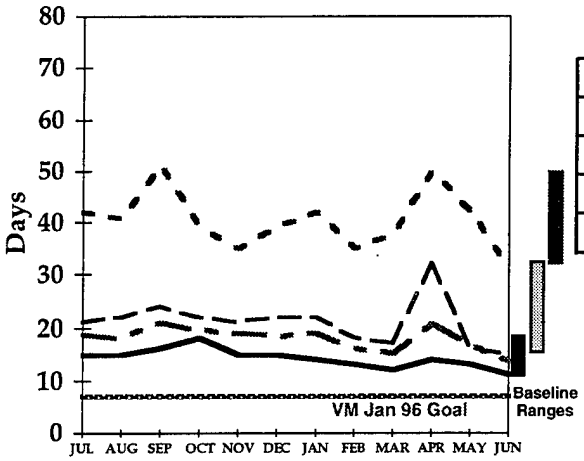
Scorecard

	Mean	Median	75%	95%
Current Month	14.4	10	14	42
Previous Month	15.1	11	14	39
Baseline Average	16.2	13	18	40
% Improv vs. Baseline	+11	+23	+22	-5

Velocity Management

Monthly Report for Ft. Campbell
IPG2 Requisitions

CONUS Active Army, Class IX, no backorders



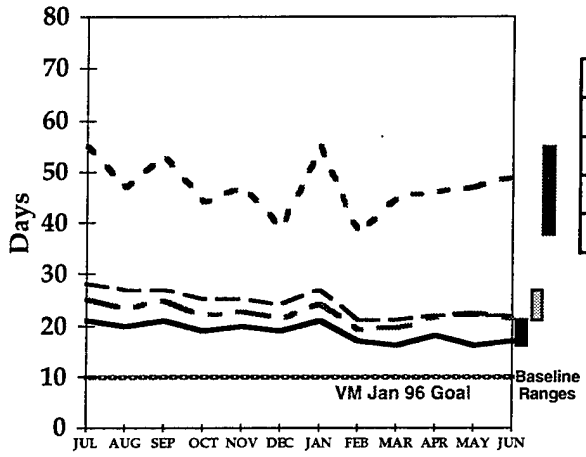
Scorecard

	Mean	Median	75%	95%
Current Month	13.7	11	15	31
Previous Month	16.6	13	16	42
Baseline Average	18.1	14	21	42
% Improv vs. Baseline	+24	+21	+29	+26

Velocity Management

Monthly Report for Ft. Campbell
IPG3 Requisitions

CONUS Active Army, Class IX, no backorders



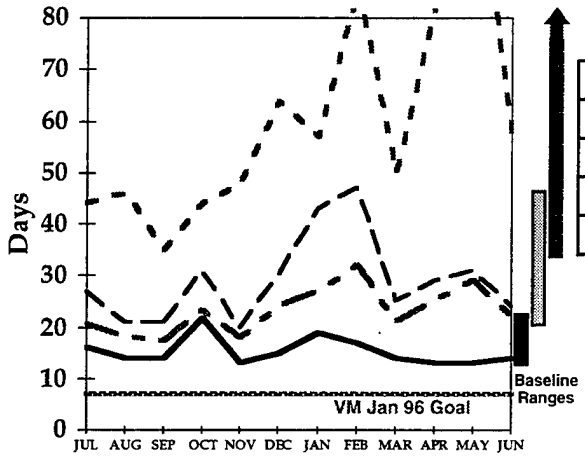
Scorecard

	Mean	Median	75%	95%
Current Month	21.3	17	22	49
Previous Month	22.5	16	22	47
Baseline Average	22.0	19	23	47
% Improv vs. Baseline	+3	+11	+4	-4

Velocity Management

Monthly Report for Ft. Hood
IPG1 Requisitions

CONUS Active Army, Class IX, no backorders



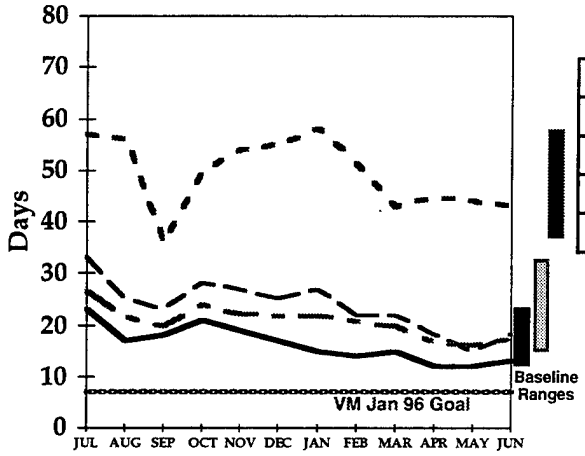
Scorecard

	Mean	Median	75%	95%
Current Month	22.3	14	24	57
Previous Month	29.2	13	31	112
Baseline Average	23.8	15	28	64
% Improv vs. Baseline	+6	+7	+14	+11

Velocity Management

Monthly Report for Ft. Hood
IPG2 Requisitions

CONUS Active Army, Class IX, no backorders



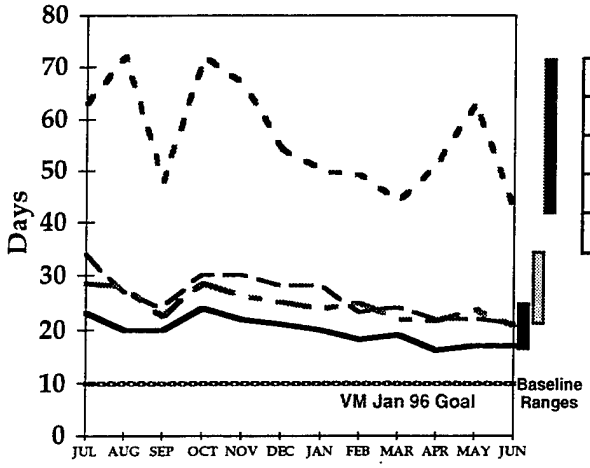
Scorecard

	Mean	Median	75%	95%
Current Month	17.2	13	18	43
Previous Month	16.1	12	15	44
Baseline Average	20.4	15	23	51
% Improv vs. Baseline	+16	+13	+22	16

Velocity Management

Monthly Report for Ft. Hood
IPG3 Requisitions

CONUS Active Army, Class IX, no backorders



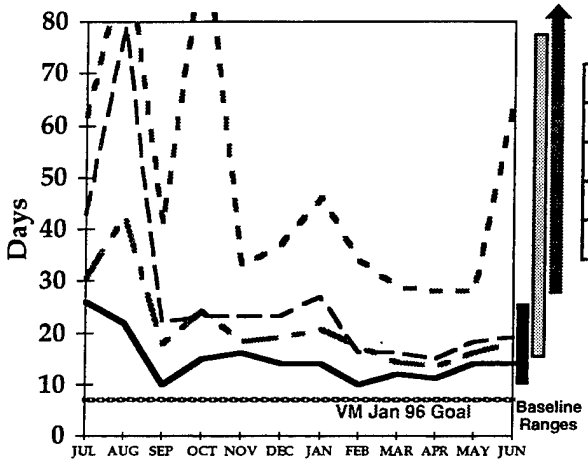
Scorecard

	Mean	Median	75%	95%
Current Month	20.8	17	21	42
Previous Month	23.7	17	22	63
Baseline Average	24.3	20	26	58
% Improv vs. Baseline	+14	+15	+19	+28

Velocity Management

Monthly Report for Ft. Irwin
IPG1 Requisitions

CONUS Active Army, Class IX, no backorders



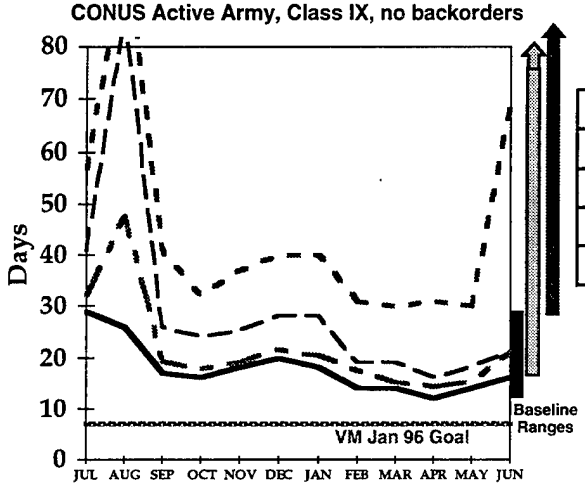
Scorecard

	Mean	Median	75%	95%
Current Month	18.0	14	19	66
Previous Month	16.1	14	18	28
Baseline Average	19.7	14	21	61
% Improv vs. Baseline	+9	+0	+10	-8

Velocity Management

Monthly Report for Ft. Irwin
IPG2 Requisitions

CONUS Active Army, Class IX, no backorders



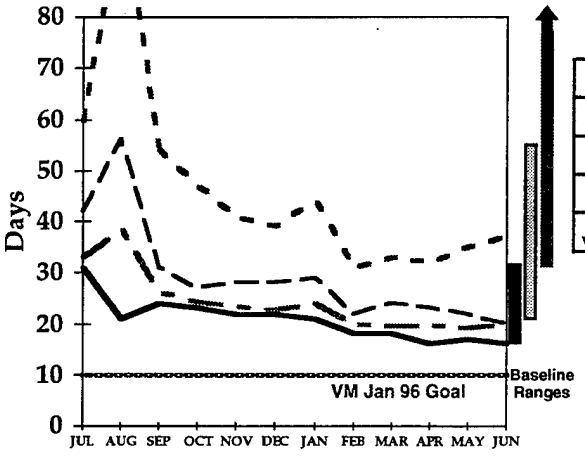
Scorecard

	Mean	Median	75%	95%
Current Month	21.0	16	21	70
Previous Month	15.5	14	18	30
Baseline Average	20.2	16	24	45
% Improv vs. Baseline	-4	+0	+13	-56

Velocity Management

Monthly Report for Ft. Irwin
IPG3 Requisitions

CONUS Active Army, Class IX, no backorders



Scorecard

	Mean	Median	75%	95%
Current Month	19.7	16	20	37
Previous Month	19.3	17	22	35
Baseline Average	23.3	20	27	48
% Improv vs. Baseline	+15	+20	+26	+23

Velocity Management

TABLE B.1: FT BRAGG - PRIORITY P1-3

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95 , No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1721	0	3.1	1	3	11	1705	1	0.8	0	1	3	1647	4	4.1	2	5	13	1321	23	2.6	2	4	7
1994.08	2626	0	3.4	1	4	7	2617	0	0.7	0	1	2	2471	6	4.5	2	7	14	2226	15	2.5	2	3	6
1994.09	2137	0	2.4	1	3	7	2124	1	1.2	1	1	4	2080	2	5.4	3	7	16	1732	19	2.7	2	4	7
1994.10	1733	0	6.4	4	10	17	1716	1	1.1	1	1	3	1702	2	3.6	2	5	10	1252	28	2.6	2	3	7
1994.11	2809	0	8.8	4	11	32	2799	0	1.1	1	1	3	2785	1	4.2	3	6	11	2566	9	3.0	2	4	8
1994.12	3144	0	3.9	3	5	10	3136	0	1.3	1	1	3	3111	1	4.4	3	6	12	2779	12	2.5	2	4	7
1995.01	2223	0	3.9	2	5	11	2210	1	1.1	1	1	3	2194	1	4.1	2	5	15	2097	6	3.3	2	5	8
1995.02	2799	0	6.1	3	7	25	2783	1	1.3	1	1	4	2751	2	3.8	3	5	12	2549	9	3.0	2	4	7
1995.03	2982	0	2.9	1	3	8	2960	0	1.1	1	1	3	2918	2	3.9	3	5	11	2699	9	2.9	2	4	7
1995.04	2397	0	2.3	1	3	7	2381	1	1.0	1	1	3	2324	3	2.9	2	4	6	2218	7	2.7	2	4	7
1995.05	2391	0	3.4	1	4	8	2380	0	1.2	1	1	3	2330	3	4.1	3	5	9	2216	7	2.7	1	4	7
1995.06	1890	0	3.0	1	3	9	1879	1	1.1	0	1	3	1854	2	4.9	3	6	13	1729	9	2.9	2	4	8

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1266	26	2.7	0	2	10	1331	23	3.3	2	5	10	1721	0	15.6	13	19	33	1661	3	7.7	6	9	18
1994.08	2001	21	1.4	0	1	5	2108	20	3.6	2	5	13	2626	0	16.0	13	19	30	2478	6	7.6	6	10	16
1994.09	1659	22	1.9	0	3	7	1735	19	3.0	1	4	9	2137	0	16.6	14	20	32	2097	2	7.7	6	8	14
1994.10	1141	34	1.8	0	2	6	1316	24	4.7	2	5	24	1733	0	20.1	16	26	45	1718	1	9.1	6	10	28
1994.11	2522	10	2.5	0	4	10	2557	9	3.7	2	6	12	2809	0	22.6	19	28	51	2794	1	8.6	7	11	17
1994.12	2610	17	4.2	1	5	20	2684	15	5.4	4	7	15	3144	0	20.1	18	24	39	3118	1	10.6	10	13	21
1995.01	1792	19	2.3	0	2	12	1798	19	8.2	6	13	22	2223	0	22.5	21	28	41	2203	1	13.5	12	19	28
1995.02	2425	13	2.3	1	2	8	2478	11	3.2	2	5	11	2799	0	19.0	15	24	40	2766	1	8.0	7	9	15
1995.03	2457	18	2.1	0	2	10	2529	15	4.7	2	6	14	2982	0	16.4	13	18	49	2928	2	8.6	6	10	21
1995.04	2045	15	1.9	0	2	6	2060	14	5.2	1	5	21	2397	0	15.1	12	16	46	2328	3	9.1	6	9	26
1995.05	1915	20	2.1	1	3	7	1929	19	21.0	2	6	132	2391	0	34.1	13	20	229	2337	2	24.7	6	11	107
1995.06	1479	22	2.3	1	3	10	1500	21	3.1	1	3	10	1890	0	16.0	12	17	34	1858	2	7.1	5	8	15

TABLE B.2: FT. BRAGG- PRIORITY P4-8

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1868	0	3.8	2	5	9	1847	1	1.0	0	1	3	1784	4	7.1	6	11	18	1460	22	3.5	3	4	9
1994.08	1992	0	5.2	3	6	11	1967	1	0.6	0	1	2	1857	7	7.5	6	9	15	1586	20	3.1	3	4	7
1994.09	2001	0	6.0	4	8	19	1995	0	1.6	1	1	9	1961	2	6.4	5	8	15	1503	25	3.3	3	4	7
1994.10	1160	0	3.1	1	2	14	1156	0	2.4	1	1	11	1155	0	6.2	6	9	14	887	24	3.2	2	4	8
1994.11	1555	0	15.9	15	24	45	1553	0	1.5	1	1	2	1548	0	4.7	4	7	11	1359	13	3.1	2	4	8
1994.12	3012	0	18.6	14	28	55	3004	0	1.5	1	2	3	3002	0	4.8	4	7	15	2747	9	2.9	2	4	8
1995.01	2215	0	9.0	4	9	33	2199	1	1.3	1	1	4	2189	1	5.4	3	7	18	2045	8	3.7	3	5	9
1995.02	2348	0	6.8	3	7	29	2332	1	1.1	1	1	4	2321	1	4.5	4	6	10	2160	8	3.7	3	5	8
1995.03	3187	0	2.9	1	3	9	3166	1	1.1	1	1	4	3136	2	4.7	3	5	13	2899	9	3.6	3	5	8
1995.04	2125	0	2.4	1	4	7	2098	1	1.0	1	1	2	2072	2	3.5	2	4	7	1972	7	3.4	3	5	7
1995.05	1651	0	4.0	2	4	7	1645	0	1.1	1	1	3	1614	2	5.8	4	6	15	1507	9	3.4	2	5	9
1995.06	1486	0	5.2	1	3	12	1479	0	1.1	1	1	3	1439	3	6.5	4	6	15	1346	9	3.3	2	5	9

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1313	30	3.3	0	5	14	1327	29	3.5	2	5	13	1868	0	21.2	18	26	38	1002	4	9.3	7	11	20
1994.08	1408	29	1.5	1	1	6	1436	28	3.6	2	5	14	1992	0	21.5	18	23	40	1079	6	8.4	6	10	18
1994.09	1433	28	2.3	0	2	6	1462	27	3.0	1	3	9	2001	0	22.8	20	27	40	1966	2	8.8	6	10	17
1994.10	836	28	2.7	1	4	6	929	20	8.6	5	12	28	1160	0	26.3	23	36	50	1158	0	14.5	10	21	33
1994.11	1339	14	2.9	0	4	11	1393	10	5.2	4	7	15	1555	0	33.1	29	37	62	1550	0	11.2	9	13	24
1994.12	2437	19	2.8	1	3	9	2465	18	6.5	6	8	17	3012	0	35.9	31	40	76	3008	0	11.0	11	15	20
1995.01	1878	15	3.4	1	4	18	1894	14	8.6	7	14	22	2215	0	30.8	27	36	62	2201	1	15.0	14	20	29
1995.02	2067	12	2.6	1	3	8	2103	10	3.7	2	6	12	2348	0	21.4	18	25	47	2335	1	9.1	8	11	18
1995.03	2699	15	2.6	1	3	12	2743	14	4.9	1	6	21	3107	0	18.6	15	20	56	3144	1	10.1	7	12	29
1995.04	1851	13	1.9	0	2	6	1861	12	5.2	2	6	19	2125	0	16.7	13	18	47	2081	2	9.9	7	11	24
1995.05	1311	21	2.3	1	4	6	1320	20	20.5	1	5	93	1651	0	37.3	14	24	137	1617	2	24.3	7	11	91
1995.06	1224	18	2.3	1	3	8	1250	16	2.5	1	3	9	1486	0	21.0	14	20	62	1444	3	7.4	6	9	16

TABLE B.3: FT. BRAGG PRIORITY P9-15

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dop						Dop->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	6139	0	4.7	2	6	10	6067	1	1.6	1	1	3	5843	5	7.9	7	11	17	5072	17	3.9	3	5	11
1994.08	7550	0	9.2	5	13	21	7450	1	1.0	0	1	2	7040	7	7.5	7	10	16	6439	15	3.4	3	4	10
1994.09	7975	0	9.2	5	13	33	7954	0	1.3	1	1	3	7878	1	7.4	6	9	15	6770	15	3.4	2	4	8
1994.10	2072	0	4.4	1	5	17	2065	0	2.3	1	1	7	2054	1	6.8	6	9	15	1474	29	3.9	3	5	9
1994.11	4210	0	14.1	9	24	42	4191	0	1.5	1	1	2	4180	1	5.6	5	8	11	3750	11	2.9	2	4	8
1994.12	6551	0	15.3	5	19	70	6522	0	1.5	1	1	3	6501	1	6.1	5	8	17	6100	7	3.0	2	4	9
1995.01	9541	0	21.5	7	36	73	9465	1	1.6	1	1	3	9432	1	5.8	4	7	10	9003	6	3.7	3	5	9
1995.02	10805	0	14.1	3	7	93	10777	0	1.5	1	1	2	10748	1	4.9	4	6	10	10057	7	3.6	3	5	8
1995.03	16081	0	3.9	2	4	12	16030	0	1.5	1	1	3	15863	1	4.9	4	6	12	14833	8	3.8	3	5	8
1995.04	10028	0	3.2	1	4	11	9999	0	2.1	1	1	4	9924	1	4.1	3	5	9	9448	6	3.4	3	5	8
1995.05	8900	0	6.9	2	4	7	8828	1	1.5	1	1	3	8686	2	5.9	4	6	12	8278	7	3.6	3	6	9
1995.06	8480	0	3.4	1	3	7	8342	2	1.3	0	1	3	8196	3	7.0	5	6	17	7903	7	3.6	3	5	9

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dop->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	4720	23	3.7	1	5	14	4780	22	2.9	1	4	11	6139	0	23.1	21	27	44	5906	4	9.0	7	11	18
1994.08	6051	20	2.1	1	2	6	6099	19	4.3	3	6	15	7550	0	27.0	23	32	47	7135	5	9.3	8	12	21
1994.09	6545	18	2.1	1	2	8	6691	16	2.8	1	3	10	7975	0	25.7	22	32	49	7896	1	7.9	6	9	16
1994.10	1363	34	2.3	1	2	6	1491	28	6.2	3	7	26	2072	0	27.5	22	34	61	2061	1	14.0	9	14	36
1994.11	3649	13	3.7	1	5	14	3693	12	4.9	4	7	13	4210	0	31.0	26	39	63	4193	0	9.7	8	12	18
1994.12	5594	15	4.1	1	5	16	5678	13	6.3	5	8	19	6551	0	34.7	27	46	84	6529	0	11.8	11	15	23
1995.01	7964	17	2.6	0	3	13	8034	16	8.8	8	14	21	9541	0	43.9	34	63	101	9475	1	15.0	14	21	27
1995.02	9670	11	3.0	1	4	11	9758	10	3.8	3	6	10	10805	0	29.8	19	26	110	10772	0	9.4	8	11	16
1995.03	13655	15	2.4	1	3	9	13794	14	5.1	3	7	15	16081	0	20.7	16	22	57	15905	1	10.4	8	12	25
1995.04	8620	14	2.5	1	2	7	8656	14	6.3	2	7	41	10028	0	20.7	14	21	63	9947	1	11.3	7	12	48
1995.05	7294	18	2.5	1	4	7	7345	17	17.8	1	5	83	8900	0	39.5	15	23	121	8719	2	23.1	7	12	85
1995.06	6618	22	2.1	1	3	9	6680	21	3.4	1	4	12	8480	0	20.2	14	20	47	8320	2	8.3	6	10	19

TABLE B.4: FT. CAMPBELL - PRIORITY P1-3

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

Month	Doc->Est						Est->MRO						MRO->Dop						Dop->CRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1549	0	3.7	2	4	10	1514	2	1.5	1	1	4	1463	6	3.4	2	4	12	963	38	3.7	3	5	8
1994.08	2572	0	3.9	2	5	13	2519	2	1.1	1	1	3	2295	11	3.2	2	3	11	1207	53	3.1	3	4	7
1994.09	1941	0	4.5	3	6	15	1920	1	2.0	1	1	10	1874	3	3.4	2	4	12	1027	47	3.3	3	4	7
1994.10	2407	0	4.4	3	6	13	2390	1	1.3	1	1	4	2349	2	3.7	2	5	11	1619	33	3.9	4	5	8
1994.11	2517	0	4.2	3	5	13	2500	1	1.3	1	1	4	2455	2	3.0	2	3	10	1675	33	4.5	4	5	10
1994.12	1661	0	4.4	3	6	10	1646	1	1.8	1	1	5	1626	2	2.0	1	2	8	1064	36	4.3	4	5	9
1995.01	1667	0	4.5	3	5	13	1543	7	1.8	1	1	4	1525	9	3.0	1	3	12	971	42	4.3	4	5	8
1995.02	2197	0	3.6	3	4	8	2171	1	1.4	1	1	3	2141	3	2.3	2	3	6	1360	38	3.8	4	5	7
1995.03	2152	0	3.9	3	6	9	2129	1	1.2	1	1	3	2090	3	2.9	2	3	11	1194	45	3.7	4	5	7
1995.04	1627	0	3.6	2	5	12	1612	1	1.2	1	1	3	1566	4	2.0	1	2	5	920	43	3.8	3	4	7
1995.05	2014	0	3.4	2	5	8	1993	1	1.4	1	1	3	1968	2	2.3	1	2	6	1081	46	3.2	3	4	6
1995.06	1726	0	3.1	2	5	7	1703	1	1.6	1	1	4	1676	3	2.6	2	3	7	965	44	3.0	3	4	7

Month	CRP->DSU						DSU->MIRP						Doc->MIRP						Dop->MIRP					
	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	843	46	0.9	0	0	0	843	46	4.8	2	5	19	1549	0	18.3	13	20	43	1495	3	9.8	6	10	29
1994.08	370	86	6.8	0	0	2	370	86	7.3	3	6	32	2572	0	16.7	13	20	35	2348	9	8.5	6	8	21
1994.09	566	71	4.3	0	0	2	566	71	3.6	1	3	11	1941	0	18.5	15	22	42	1895	2	8.4	6	9	20
1994.10	1427	41	1.3	0	0	1	1427	41	2.7	1	3	7	2407	0	16.1	13	20	31	2366	2	6.9	5	8	13
1994.11	1557	38	0.7	0	0	1	1557	38	3.1	1	3	12	2517	0	17.6	14	20	37	2470	2	8.6	6	9	24
1994.12	981	41	0.2	0	0	0	981	41	2.2	0	1	7	1661	0	15.3	12	16	34	1639	1	7.3	5	7	16
1995.01	857	49	0.3	0	0	0	857	49	2.8	0	2	13	1667	0	17.8	13	21	47	1649	1	8.8	6	8	36
1995.02	1318	40	0.0	0	0	0	1318	40	2.7	1	2	7	2197	0	14.3	12	14	29	2166	1	6.9	5	6	14
1995.03	1165	46	0.2	0	0	0	1165	46	1.8	1	1	6	2152	0	14.1	12	15	29	2111	2	6.2	4	6	15
1995.04	893	45	0.4	0	0	0	893	45	6.9	1	3	32	1627	0	17.0	11	18	50	1581	3	10.1	5	8	36
1995.05	1027	49	0.2	0	0	0	1027	49	4.5	1	3	23	2014	0	15.1	11	14	39	1988	1	8.0	5	7	29
1995.06	930	46	0.1	0	0	0	930	46	3.1	1	2	17	1726	0	14.4	10	14	42	1696	2	7.1	4	6	36

TABLE B.5: FT. CAMPBELL PRIORITY P4-8

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	788	0	3.6	2	5	9	779	1	1.4	1	1	4	748	5	4.1	2	6	12	541	31	3.9	4	6	8
1994.08	1570	0	4.3	2	5	16	1524	3	1.2	1	1	3	1442	8	4.1	2	6	12	784	50	3.4	3	4	7
1994.09	1289	0	4.9	3	6	17	1273	1	2.0	1	1	11	1248	3	4.4	2	6	12	731	43	3.3	3	4	7
1994.10	1449	0	4.9	3	7	13	1438	1	1.4	1	1	4	1427	2	5.6	5	9	12	1094	24	4.3	4	6	9
1994.11	1421	0	4.1	3	5	9	1415	0	1.6	1	1	3	1411	1	4.2	2	5	12	963	32	4.7	4	6	10
1994.12	1161	0	5.3	4	6	15	1152	1	1.8	1	2	5	1148	1	3.8	2	6	13	662	43	4.8	4	6	10
1995.01	1170	0	5.0	3	6	14	1127	4	1.8	1	1	4	1124	4	4.3	2	6	14	747	36	5.1	5	6	12
1995.02	1271	0	4.3	3	5	9	1256	1	1.8	1	1	9	1255	1	3.1	2	4	9	750	41	4.2	4	5	8
1995.03	1269	0	4.4	4	6	12	1265	0	1.3	1	1	3	1254	1	3.2	2	4	11	735	42	3.7	3	4	7
1995.04	1404	0	4.3	2	5	14	1352	4	1.2	1	1	3	1311	7	2.5	1	3	7	906	35	4.3	4	5	8
1995.05	1321	0	3.5	3	4	7	1311	1	1.5	1	1	3	1293	2	4.0	2	4	10	781	41	3.8	3	5	7
1995.06	1079	0	3.6	3	5	7	1068	1	1.4	1	1	4	1054	2	2.7	2	3	7	646	40	3.4	3	4	7

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dop->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	492	38	1.4	0	0	1	492	38	4.5	2	5	15	788	0	10.6	15	21	42	757	4	9.8	7	10	26
1994.08	231	85	5.1	0	0	2	231	85	7.2	5	6	34	1570	0	10.2	15	22	41	1486	5	8.9	7	10	24
1994.09	426	67	4.1	0	0	2	426	67	3.3	1	4	8	1289	0	21.1	16	24	51	1260	2	9.4	7	9	39
1994.10	890	39	1.3	0	0	1	890	39	2.6	1	3	7	1449	0	19.5	18	22	39	1438	1	7.7	6	8	16
1994.11	867	39	0.7	0	0	0	867	39	3.6	1	5	12	1421	0	19.1	15	21	35	1416	0	9.3	7	10	20
1994.12	580	50	0.2	0	0	0	580	50	2.4	0	3	12	1161	0	18.3	15	22	39	1156	0	7.4	5	8	17
1995.01	610	48	0.0	0	0	0	610	48	2.1	0	1	7	1170	0	19.0	14	22	42	1167	0	7.7	6	7	20
1995.02	723	43	0.2	0	0	0	723	43	2.7	1	2	6	1271	0	16.1	13	18	35	1269	0	7.1	5	7	16
1995.03	706	44	0.1	0	0	1	706	44	2.2	1	1	8	1269	0	15.2	12	17	38	1258	1	6.3	4	6	20
1995.04	875	38	0.4	0	0	1	875	38	8.6	1	15	32	1404	0	20.7	14	32	50	1358	3	13.1	6	23	36
1995.05	691	48	0.4	0	0	0	691	48	4.0	2	4	15	1321	0	16.6	13	16	42	1303	1	7.7	5	7	27
1995.06	627	42	0.1	0	0	0	627	42	2.7	1	2	11	1079	0	13.7	11	15	31	1065	1	6.0	4	6	17

TABLE B.6: FT. CAMPBELL PRIORITY P9-15

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	3450	0	4.5	3	5	9	3393	2	1.5	1	1	3	3314	4	7.7	7	10	15	2137	38	4.5	5	7	9
1994.08	6012	0	5.2	3	6	22	5862	2	1.3	1	1	3	5591	7	7.0	6	10	13	3618	40	4.1	3	6	8
1994.09	3982	0	4.2	3	6	10	3934	1	1.6	1	1	4	3853	3	7.6	7	10	14	2023	49	4.1	4	6	8
1994.10	7126	0	6.0	4	8	16	7060	1	2.2	1	1	4	7029	1	6.3	6	9	12	5260	26	4.4	4	6	8
1994.11	5435	0	4.1	3	5	9	5383	1	1.4	1	1	3	5352	2	7.5	6	10	14	3637	33	5.0	5	7	9
1994.12	4930	0	4.5	3	6	9	4887	1	2.0	1	1	4	4867	1	6.6	5	9	15	2571	48	6.0	6	7	11
1995.01	5614	0	5.2	4	6	13	5191	8	1.7	1	1	4	5170	8	6.9	6	10	15	3571	36	7.1	6	9	12
1995.02	6765	0	4.1	4	5	8	6709	1	1.4	1	1	4	6662	2	5.3	5	7	11	3704	45	5.7	6	7	10
1995.03	7473	0	4.3	3	6	9	7399	1	2.0	1	1	4	7310	2	5.7	5	7	11	4656	38	4.9	5	6	8
1995.04	5875	0	4.3	3	6	9	5815	1	1.8	1	1	3	5757	2	5.3	4	7	11	4050	31	6.5	5	7	21
1995.05	6048	0	3.8	3	5	8	5973	1	2.5	1	1	3	5862	3	6.9	5	8	12	3274	46	5.1	5	6	10
1995.06	5287	0	4.6	3	5	9	5219	1	1.3	1	1	3	5116	3	6.4	6	8	14	2704	49	5.4	5	6	11

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1481	57	1.7	0	0	1	1481	57	5.2	2	5	20	3450	0	25.0	21	28	55	3368	2	11.2	9	13	26
1994.08	904	85	4.2	0	1	2	904	85	7.5	5	7	29	6012	0	23.4	20	27	47	5729	5	9.9	8	12	22
1994.09	831	79	4.9	0	1	3	831	79	6.9	3	6	36	3982	0	24.9	21	27	53	3895	2	11.4	8	12	34
1994.10	3866	46	1.1	0	0	1	3866	46	2.3	1	4	6	7126	0	21.8	19	25	44	7090	1	7.4	6	8	13
1994.11	2687	51	0.6	0	0	1	2687	51	3.2	1	4	12	5435	0	22.7	20	25	47	5399	1	9.7	8	10	20
1994.12	2157	56	0.2	0	0	0	2157	56	2.5	1	4	8	4930	0	21.4	19	24	39	4905	1	8.3	7	9	15
1995.01	2642	53	0.4	0	0	0	2642	53	3.3	1	2	25	5614	0	24.3	21	27	55	5590	0	10.2	7	10	34
1995.02	3394	50	0.1	0	0	1	3394	50	3.0	1	2	14	6765	0	19.2	17	21	38	6711	1	8.3	7	9	20
1995.03	4222	44	0.4	0	1	3	4222	44	2.1	1	2	5	7473	0	19.6	16	21	45	7377	1	7.4	6	8	18
1995.04	3476	41	1.3	0	0	10	3476	41	4.8	1	3	32	5875	0	21.7	18	22	46	5811	1	10.4	7	10	37
1995.05	2692	55	0.2	0	0	1	2692	55	4.9	2	4	25	6048	0	22.5	16	22	47	5931	2	9.5	7	9	27
1995.06	2419	54	0.2	0	0	1	2419	54	3.5	1	2	16	5287	0	21.3	17	22	49	5178	2	9.0	7	9	34

TABLE B.7: FT. HOOD - PRIORITY P1-3

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95 , No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	3681	0	6.7	4	8	21	3656	1	2.3	2	4	5	3589	2	4.6	2	6	12	2696	27	2.8	2	4	7
1994.08	5547	0	4.8	3	6	11	5458	2	1.8	1	2	5	5087	8	3.6	2	5	11	2329	58	2.7	2	3	6
1994.09	5002	0	3.9	3	5	10	4983	0	1.9	1	2	5	4935	1	3.7	2	5	11	418	92	4.0	4	4	7
1994.10	6667	0	5.7	4	6	20	6628	1	1.8	1	2	6	6561	2	4.6	3	7	12	935	86	4.9	4	4	8
1994.11	4664	0	3.6	2	4	13	4647	0	2.5	1	3	9	4595	1	3.6	2	5	11	2877	38	3.2	2	4	8
1994.12	4762	0	3.8	3	5	9	4731	1	2.1	1	3	5	4687	2	4.0	2	6	11	3062	36	3.7	3	5	10
1995.01	6540	1	5.0	3	6	14	6517	1	5.0	1	4	21	6406	3	4.3	3	6	14	5730	13	4.6	4	6	13
1995.02	7522	0	6.5	2	5	14	7504	0	4.0	2	4	15	7392	2	4.4	3	6	12	5904	22	4.1	4	6	10
1995.03	6565	0	3.6	2	4	8	6547	0	2.5	1	2	8	6399	3	4.2	3	5	11	5160	21	3.3	3	5	8
1995.04	6255	0	2.7	2	4	8	6221	1	2.3	1	2	10	6136	2	3.6	2	5	10	4858	22	3.1	2	5	8
1995.05	6399	0	3.8	2	4	9	6379	0	1.8	1	2	4	6232	3	4.2	3	5	11	5134	20	3.8	3	6	10
1995.06	6330	0	4.4	2	4	14	6309	0	2.0	1	3	5	6224	2	3.9	3	5	10	5278	17	3.3	3	5	8

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	2392	35	3.0	0	1	5	2392	35	3.5	2	6	13	3681	0	20.0	16	27	44	3609	2	7.6	6	10	19
1994.08	2044	63	3.5	2	2	2	2044	63	6.2	0	6	39	5547	0	18.0	14	21	46	5169	7	8.0	5	9	39
1994.09	76	98	36.3	1	2	218	76	98	50.9	57	70	84	5002	0	17.5	14	21	35	4954	1	8.0	6	9	18
1994.10	48	99	89.7	110	151	204	48	99	19.5	0	34	77	6667	0	23.4	22	31	44	6599	1	11.3	7	17	29
1994.11	2229	52	2.0	1	2	5	2229	52	2.7	1	6	8	4664	0	18.2	13	20	48	4608	1	8.6	6	9	27
1994.12	2184	54	4.6	1	5	13	2184	54	5.1	1	4	20	4762	0	24.1	15	30	64	4712	1	14.3	7	16	48
1995.01	4228	36	2.5	1	3	5	4228	36	5.0	3	7	20	6603	0	27.2	19	43	57	6490	2	13.2	9	17	40
1995.02	4375	42	2.1	1	2	9	4375	42	10.9	2	19	58	7523	0	32.2	17	47	86	7406	2	17.4	8	24	70
1995.03	4153	37	1.1	1	1	3	4153	37	4.7	2	4	13	6565	0	21.1	14	25	50	6415	2	11.0	7	12	29
1995.04	4162	33	1.1	1	1	3	4162	33	7.9	3	8	31	6255	0	25.4	13	29	83	6161	2	16.9	6	18	68
1995.05	3867	40	1.2	1	1	3	3867	40	6.6	1	4	45	6399	0	29.2	13	31	112	6247	2	19.5	7	18	88
1995.06	4180	34	1.3	1	1	3	4180	34	4.7	1	5	14	6330	0	22.3	14	24	57	6243	1	12.0	6	13	39

TABLE B.8: FT. HOOD PRIORITY P4-8

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	2763	0	9.0	5	13	38	2747	1	2.2	2	3	5	2719	2	6.5	6	9	14	2223	20	3.9	3	6	9
1994.08	3717	0	5.8	3	6	15	3688	1	2.1	1	2	6	3534	5	5.3	4	7	13	1886	49	3.6	3	5	7
1994.09	4461	0	3.9	3	5	11	4419	1	1.9	1	2	4	4405	1	6.0	5	9	15	1051	76	4.5	4	5	7
1994.10	3271	0	6.5	4	7	20	3237	1	2.5	2	3	8	3218	2	5.3	5	8	13	722	78	6.0	4	6	8
1994.11	3588	0	4.4	2	4	17	3579	0	3.2	2	3	10	3550	1	5.3	5	8	13	2537	29	5.2	4	6	17
1994.12	3177	0	3.2	2	4	8	3163	0	2.0	1	2	6	3130	1	4.7	4	7	12	2323	27	5.5	4	7	14
1995.01	3912	1	3.2	2	4	8	3870	2	5.3	1	3	31	3818	3	4.3	3	6	11	3463	12	4.4	4	6	10
1995.02	4534	0	3.0	1	3	7	4514	0	3.1	2	3	19	4464	2	4.6	4	6	11	3369	26	4.1	3	6	10
1995.03	4277	0	3.6	2	4	7	4267	0	3.2	1	2	19	4215	1	4.6	3	6	12	3685	14	4.2	4	6	9
1995.04	4021	0	2.6	1	3	8	4008	0	1.8	1	2	4	3919	3	3.6	3	5	10	3217	20	3.1	3	4	7
1995.05	4250	0	2.6	1	3	6	4244	0	1.6	1	2	4	4172	2	3.9	3	5	8	3492	18	3.4	3	5	7
1995.06	3796	0	2.9	2	3	7	3781	0	1.9	1	2	4	3712	2	3.6	3	5	8	3110	10	3.2	3	5	8

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	1862	33	2.0	1	3	5	1862	33	3.2	1	4	10	2763	0	26.5	23	33	57	2734	1	9.0	7	12	21
1994.08	1462	61	3.3	1	2	6	1462	61	6.1	0	4	39	3717	0	21.7	17	25	56	3561	4	9.0	6	9	42
1994.09	36	99	28.8	2	6	205	36	99	42.6	44	62	72	4461	0	19.9	18	23	36	4446	0	8.1	7	10	17
1994.10	38	99	27.2	3	21	210	38	99	17.2	0	0	97	3271	0	23.9	21	28	50	3251	1	9.7	7	12	29
1994.11	1773	51	2.6	2	3	11	1773	51	2.0	0	2	8	3588	0	22.2	19	27	54	3558	1	9.4	8	12	24
1994.12	1904	40	6.4	1	8	13	1904	40	3.7	1	4	15	3177	0	21.9	17	25	55	3139	1	12.1	8	13	40
1995.01	3024	23	3.2	1	3	5	3024	23	3.5	1	4	17	3937	0	21.9	15	27	50	3082	1	9.4	7	11	28
1995.02	3001	34	1.3	1	2	4	3001	34	4.9	1	5	22	4534	0	20.7	14	22	51	4483	1	10.1	7	10	29
1995.03	3351	22	0.9	1	1	3	3351	22	3.5	2	4	10	4277	0	19.8	15	22	43	4221	1	8.5	7	10	20
1995.04	2997	25	0.9	1	1	3	2997	25	4.7	2	5	24	4021	0	16.6	12	18	45	3930	2	8.6	6	9	34
1995.05	3156	26	1.3	1	1	3	3156	26	3.0	1	3	8	4250	0	16.1	12	15	44	4178	2	7.8	6	8	21
1995.06	2820	26	2.1	1	1	3	2820	26	4.2	1	4	16	3796	0	17.2	13	18	43	3726	2	8.7	6	10	26

TABLE B.9: FT. HOOD PRIORITY P9-15

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	15523	0	9.0	5	13	30	15426	1	2.6	2	3	5	15251	2	8.0	7	11	14	12961	17	4.5	4	6	9
1994.08	15759	0	7.0	3	6	20	15578	1	2.3	1	2	5	14889	6	6.9	7	8	13	8305	47	4.4	4	6	10
1994.09	16619	0	3.6	2	4	8	16569	0	2.1	1	2	5	16464	1	7.9	8	10	16	5004	70	4.7	4	5	7
1994.10	15562	0	9.5	4	9	53	15337	1	2.7	2	4	7	15236	2	7.4	7	9	14	5471	65	4.9	4	5	8
1994.11	17491	0	5.0	2	4	15	17416	0	2.8	2	3	8	17100	2	7.6	7	9	14	12705	27	6.9	6	7	17
1994.12	18230	0	3.7	2	4	8	18161	0	2.9	2	3	9	17858	2	6.6	6	8	13	13719	25	7.0	6	9	16
1995.01	16977	1	3.8	2	4	10	16903	1	2.5	1	3	5	16660	2	6.6	6	8	14	15273	11	6.6	6	7	19
1995.02	22354	0	4.3	1	2	6	22272	0	2.5	2	3	6	21981	2	6.5	6	8	12	17953	20	5.4	6	7	11
1995.03	25136	0	2.6	2	4	6	25049	0	3.5	1	2	26	24618	2	6.4	6	7	13	21083	13	5.6	6	7	11
1995.04	21936	0	1.9	1	2	6	21852	0	3.7	2	2	4	21549	2	6.4	6	7	13	10805	14	4.8	5	6	8
1995.05	20552	0	4.2	1	3	7	20499	0	2.2	1	2	4	19880	3	7.1	5	7	16	17593	14	5.1	6	6	8
1995.06	18659	0	2.8	1	3	7	18568	0	1.9	1	2	4	18260	2	5.8	5	7	13	16414	12	5.2	6	7	11

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	10098	35	2.0	1	4	5	10098	35	3.0	1	3	11	15523	0	28.5	23	34	63	15336	1	9.1	8	11	20
1994.08	5405	66	2.1	1	2	6	5405	66	9.6	0	8	39	15759	0	27.7	20	27	72	15051	4	11.5	7	11	44
1994.09	165	99	14.5	2	6	193	165	99	47.2	44	64	76	16619	0	22.5	20	24	48	16495	1	8.9	7	11	18
1994.10	266	98	17.3	2	5	170	266	98	9.8	0	0	65	15562	0	28.5	24	30	72	15450	1	9.1	7	11	24
1994.11	8371	52	2.7	2	3	7	8371	52	1.7	0	1	7	17491	0	26.3	22	30	67	17240	1	11.0	9	13	28
1994.12	11109	39	6.5	1	9	13	11109	39	2.3	0	2	8	18230	0	25.0	21	28	54	17900	2	12.0	9	14	34
1995.01	11549	32	3.8	1	3	5	11549	32	3.2	0	3	14	17082	0	23.8	20	28	50	16810	2	11.2	8	13	28
1995.02	14743	34	1.3	1	2	4	14743	34	4.0	1	3	12	22356	0	24.7	18	23	49	22037	1	11.3	8	11	28
1995.03	18866	25	0.8	1	1	3	18866	25	2.9	1	4	8	25136	0	21.9	19	24	44	24674	2	9.4	8	11	19
1995.04	17238	21	0.9	1	1	4	17238	21	4.0	1	4	18	21936	0	21.5	16	22	51	21611	1	9.5	7	10	27
1995.05	15858	23	1.3	1	1	3	15858	23	3.4	1	3	14	20552	0	23.7	17	22	63	19912	3	10.2	8	10	28
1995.06	15378	18	3.0	1	1	7	15378	18	3.8	1	4	11	18659	0	20.8	17	21	42	18339	2	10.2	8	12	22

TABLE B-10: FT. IRWIN (NTC) - PRIORITY P1-3

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	563	0	7.2	3	9	23	553	2	0.7	0	1	3	548	3	5.4	3	7	15	410	27	11.9	9	14	35
1994.08	864	0	8.6	5	13	22	855	1	1.4	1	1	2	808	6	2.3	1	2	9	498	42	7.2	5	6	16
1994.09	842	0	2.8	2	4	8	837	1	1.4	0	1	8	818	3	2.8	1	3	12	146	83	6.0	6	7	13
1994.10	684	0	3.1	2	4	8	679	1	1.3	1	1	3	666	3	4.2	3	6	12	497	27	8.9	7	11	20
1994.11	1034	0	2.8	2	4	8	1029	0	1.9	1	1	3	1027	1	4.9	4	7	12	967	6	8.4	8	11	18
1994.12	733	0	2.9	2	4	7	730	0	1.1	1	1	3	727	1	4.2	2	7	13	577	21	8.3	7	11	21
1995.01	732	0	2.9	2	4	7	714	2	2.1	1	1	4	711	3	3.6	2	5	12	684	7	9.4	6	14	24
1995.02	635	0	1.9	1	3	7	624	2	1.8	1	1	3	614	3	3.2	2	3	9	458	28	6.1	5	8	13
1995.03	1539	0	2.2	2	4	5	1532	0	1.1	1	1	3	1509	2	3.1	2	4	9	1318	14	7.4	7	10	14
1995.04	1583	0	1.8	1	2	5	1576	0	1.1	1	1	3	1551	2	2.5	2	3	7	1315	17	7.7	7	10	17
1995.05	1124	0	2.3	2	4	5	1118	1	1.3	1	1	3	1069	5	3.5	2	4	11	1005	11	8.5	7	11	15
1995.06	1128	0	2.5	2	4	6	1123	0	1.1	1	1	2	1106	2	3.0	2	4	10	364	68	7.2	8	9	14

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	345	39	2.9	0	2	15	345	39	0.1	0	0	0	563	0	30.8	26	43	62	557	1	17.9	11	23	48
1994.08	89	90	1.0	0	0	1	89	90	21.3	0	49	67	864	0	42.5	22	79	94	816	6	28.4	5	56	78
1994.09	35	96	0.0	0	0	0	35	96	2.3	0	0	0	842	0	17.8	10	22	41	823	2	10.2	5	10	33
1994.10	115	83	0.2	0	0	0	115	83	0.0	0	0	0	684	0	24.1	15	23	97	671	2	14.5	6	12	35
1994.11	370	64	1.0	0	1	7	370	64	0.0	0	0	0	1034	0	18.4	16	23	33	1032	0	8.8	7	11	20
1994.12	194	74	1.4	0	0	15	194	74	0.3	0	0	2	733	0	18.9	14	23	37	730	0	10.2	7	12	22
1995.01	220	70	0.1	0	0	0	220	70	0.2	0	0	0	732	0	20.6	14	27	46	729	0	11.7	6	17	28
1995.02	172	73	0.0	0	0	0	172	73	1.7	0	0	0	635	0	17.3	10	16	34	625	2	10.7	4	8	20
1995.03	597	61	0.1	0	0	0	597	61	0.6	0	0	0	1539	0	14.2	12	16	29	1515	2	7.9	6	9	17
1995.04	800	49	0.1	0	0	0	800	49	0.6	0	0	0	1583	0	13.4	11	15	28	1558	2	8.2	6	9	19
1995.05	600	47	0.0	0	0	0	600	47	0.1	0	0	0	1124	0	16.1	14	18	28	1074	4	8.6	7	10	19
1995.06	180	84	0.5	0	0	0	180	84	4.9	0	0	55	1128	0	18.0	14	19	66	1111	2	11.4	7	10	56

TABLE B.11: FT. IRWIN (NTC) PRIORITY P4-8

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	517	0	7.1	4	7	23	516	0	0.5	0	1	2	515	0	7.9	7	10	14	467	10	14.8	14	20	35
1994.08	512	0	6.9	3	6	19	510	0	1.0	1	1	3	464	9	5.0	4	7	12	322	37	9.0	7	12	20
1994.09	637	0	1.9	2	3	6	636	0	1.5	0	1	8	633	1	6.3	4	8	19	188	70	8.3	5	11	16
1994.10	774	0	3.0	3	5	8	773	0	1.1	1	1	2	771	0	5.1	5	7	13	687	11	9.7	8	13	21
1994.11	959	0	3.0	3	5	8	945	1	1.6	1	1	11	933	3	5.4	5	8	12	896	7	8.3	8	11	18
1994.12	909	0	2.8	3	4	7	906	0	1.3	1	1	3	902	1	6.1	5	9	13	746	18	9.6	9	14	24
1995.01	572	0	3.2	2	4	8	563	2	1.2	1	1	4	560	2	5.0	3	8	15	546	5	10.5	9	13	27
1995.02	631	0	2.4	2	3	6	621	2	1.5	1	1	5	620	2	4.7	3	6	12	532	16	7.7	7	10	13
1995.03	1175	0	1.8	1	3	5	1171	0	1.1	1	1	3	1149	2	4.1	3	6	12	1069	9	8.0	8	11	14
1995.04	1213	0	1.9	2	3	4	1203	1	1.1	1	1	2	1190	2	3.1	2	3	10	1137	6	8.2	8	10	17
1995.05	1014	0	2.3	2	3	5	1003	1	1.0	1	1	2	922	9	3.2	2	3	9	884	13	9.3	9	12	16
1995.06	665	0	2.9	3	4	6	656	1	1.7	1	1	2	645	3	3.3	2	5	10	276	58	8.6	8	12	16

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	430	17	3.3	0	2	15	430	17	0.2	0	0	0	517	0	32.2	29	41	57	516	0	16.7	13	19	35
1994.08	91	82	1.2	0	0	8	91	82	24.7	6	50	70	512	0	47.7	26	86	99	465	9	30.0	11	56	85
1994.09	34	95	0.0	0	0	0	34	95	0.2	0	0	1	637	0	19.4	17	26	41	634	0	9.7	9	13	19
1994.10	187	76	0.1	0	0	0	187	76	0.0	0	0	0	774	0	17.9	16	24	32	772	0	8.8	7	12	19
1994.11	336	65	0.8	0	1	2	336	65	0.2	0	0	0	959	0	19.1	18	25	37	947	1	9.0	8	12	19
1994.12	223	75	1.9	0	0	15	223	75	0.4	0	0	2	909	0	21.7	20	28	40	905	0	11.4	10	15	23
1995.01	169	70	0.1	0	0	0	169	70	1.2	0	0	2	572	0	20.4	18	28	40	569	1	11.0	8	17	27
1995.02	207	67	0.2	0	0	1	207	67	0.2	0	0	0	631	0	17.6	14	19	31	630	0	9.2	7	10	18
1995.03	455	61	0.2	0	0	0	455	61	0.2	0	0	0	1175	0	15.3	14	19	30	1153	2	8.4	8	10	18
1995.04	662	45	0.3	0	0	0	662	45	0.2	0	0	0	1213	0	14.2	12	16	31	1200	1	8.4	7	10	22
1995.05	573	43	0.1	0	0	0	573	43	0.2	0	0	0	1014	0	15.5	14	18	30	933	8	9.0	8	11	21
1995.06	136	80	0.0	0	0	0	136	80	9.4	0	0	68	665	0	21.0	16	21	70	654	2	13.3	9	12	62

TABLE B.12: FT. IRWIN (NTC) PRIORITY P9-15

CONUS Statistics for the Elapsed Time Between Events
LIF Data for Period MIRP Date = July94-June95, No Backorders
Resident Commands and Supply Class 9 Only by Priority, Base, and MIRP Month

	Doc->Est						Est->MRO						MRO->Dep						Dep->CRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	3748	0	9.7	7	19	23	3716	1	0.9	1	1	3	3692	1	8.5	7	9	16	3529	6	13.4	13	16	28
1994.08	2416	0	5.4	2	5	16	2384	1	1.2	1	1	3	2133	12	7.3	6	9	14	1576	35	11.6	11	14	21
1994.09	3687	0	3.7	1	3	29	3661	1	1.9	1	1	8	3646	1	7.7	6	10	17	1420	61	14.8	9	15	38
1994.10	4588	0	2.9	2	3	7	4562	1	1.4	1	1	4	4552	1	7.5	7	9	16	4193	9	13.6	14	16	22
1994.11	3723	0	2.3	2	4	7	3700	1	1.5	1	1	3	3675	1	7.4	7	9	15	3582	4	10.7	10	14	21
1994.12	3268	0	2.4	2	4	7	3255	0	1.7	1	1	4	3218	2	7.1	6	10	14	2065	12	9.9	10	14	25
1995.01	3757	0	2.8	2	4	7	3707	1	1.4	1	1	3	3670	2	6.5	6	9	13	3648	3	11.7	9	16	27
1995.02	3451	0	1.7	1	2	5	3433	1	1.5	1	1	6	3413	1	6.9	6	9	13	3033	12	8.0	8	10	15
1995.03	5992	0	1.7	1	3	5	5954	1	1.2	1	1	4	5815	3	6.9	6	9	14	5620	6	8.8	9	11	15
1995.04	6096	0	1.5	1	2	5	6040	1	1.3	1	1	3	5930	3	6.4	5	8	15	5816	5	9.6	9	12	17
1995.05	4785	0	1.6	1	2	5	4724	1	1.1	1	1	2	4294	10	7.0	5	8	19	4192	12	9.4	9	12	16
1995.06	3432	0	1.8	1	3	5	3397	1	1.8	1	1	2	3277	5	5.0	4	7	14	1263	63	8.6	9	12	16

	CRP->DSU						DSU->MIRP						Doc->MIRP						Dep->MIRP					
Month	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%	N	%Ms	Mean	50%	75%	95%
1994.07	2895	23	3.9	0	5	15	2895	23	0.3	0	0	0	3748	0	33.1	31	42	60	3719	1	14.0	12	15	33
1994.08	310	87	0.9	0	0	11	312	87	17.5	0	30	67	2416	0	38.4	21	56	102	2148	11	22.7	10	19	87
1994.09	159	96	0.8	0	0	4	159	96	2.7	0	0	7	3687	0	26.2	24	31	54	3671	0	12.9	12	15	24
1994.10	931	80	0.5	0	0	0	931	80	0.1	0	0	0	4588	0	24.2	23	27	47	4575	0	12.3	12	15	20
1994.11	1152	69	1.6	0	0	17	1152	69	0.2	0	0	0	3723	0	23.3	22	28	41	3696	1	12.1	11	15	22
1994.12	814	75	1.9	0	0	15	814	75	0.4	0	0	2	3268	0	22.9	22	28	39	3229	1	11.8	11	15	22
1995.01	908	76	0.4	0	0	2	908	76	0.7	0	0	0	3757	0	23.9	21	29	44	3716	1	13.2	9	19	28
1995.02	657	81	0.7	0	1	3	657	81	1.3	0	0	1	3451	0	19.8	18	22	31	3429	1	9.8	8	11	18
1995.03	1487	75	0.5	0	0	1	1487	75	0.6	0	0	0	5992	0	19.7	18	24	33	5853	2	9.9	9	12	18
1995.04	2340	62	0.3	0	0	1	2340	62	0.3	0	0	0	6096	0	19.7	16	23	32	5977	2	10.2	9	13	21
1995.05	2457	49	0.2	0	0	0	2457	49	0.1	0	0	0	4785	0	19.3	17	22	35	4351	9	9.4	8	11	20
1995.06	550	84	0.2	0	0	0	550	84	2.4	0	0	1	3432	0	19.7	16	20	37	3309	4	10.9	9	11	21

APPENDIX C: ANALYSIS OF PERIODICITY

In this appendix, we investigate the periodic peaks and valleys that are apparent when the overall OST is plotted. Figure C.1 plots out the OSTs (i.e., document date to MIRP) for three different LIF extracts: (1) the baseline period (7/1/94 to 6/30/95) for all classes of supply and CONUS customers but no backorders, (2) a year-long extract from one year earlier (7/1/93 to 6/30/93), and (3) an extract for a subset of the baseline period (9/1/94 to 3/1/95) limited to a single installation. In each of the plots the periodicity is apparent. The analysis in the remainder of this appendix focuses on the extract for installation A during a subset of the baseline period.

In Figure C.2, the segments have been accumulated to show where the periodicity begins to appear. The far left line on the graph, which shows no peaks or valleys, accumulates the first two segments associated with the order process (document date to MRO date). But when the next segment, MRO to depot ship date, is accumulated, a clear seven-day periodicity is apparent. Because of the limited

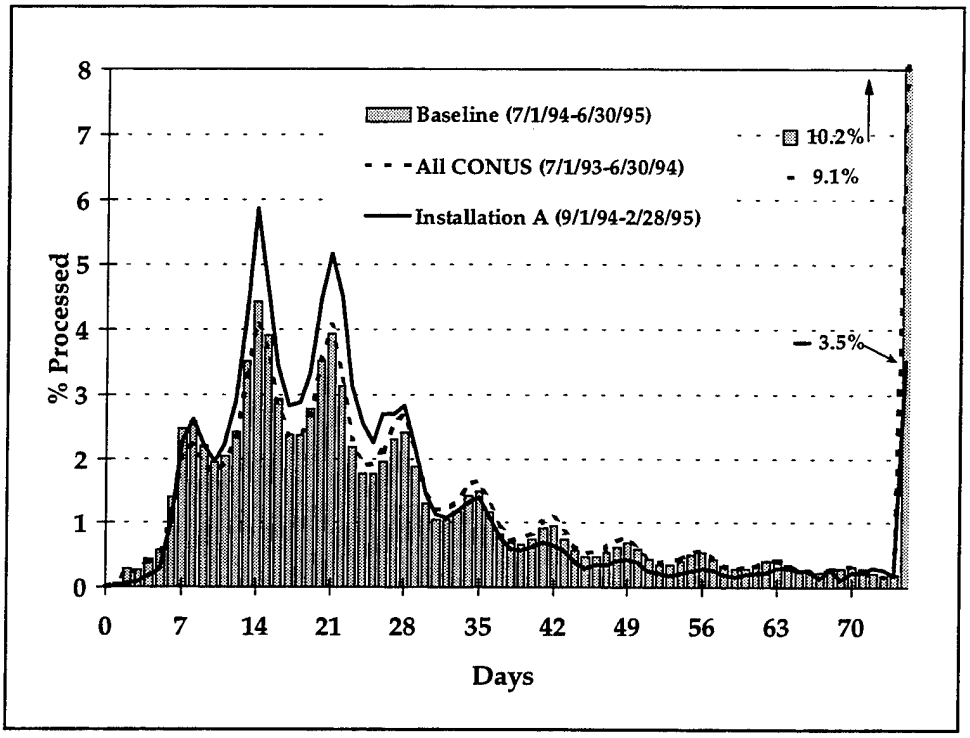


Figure C.1--Overall Performance for Three LIF Extracts

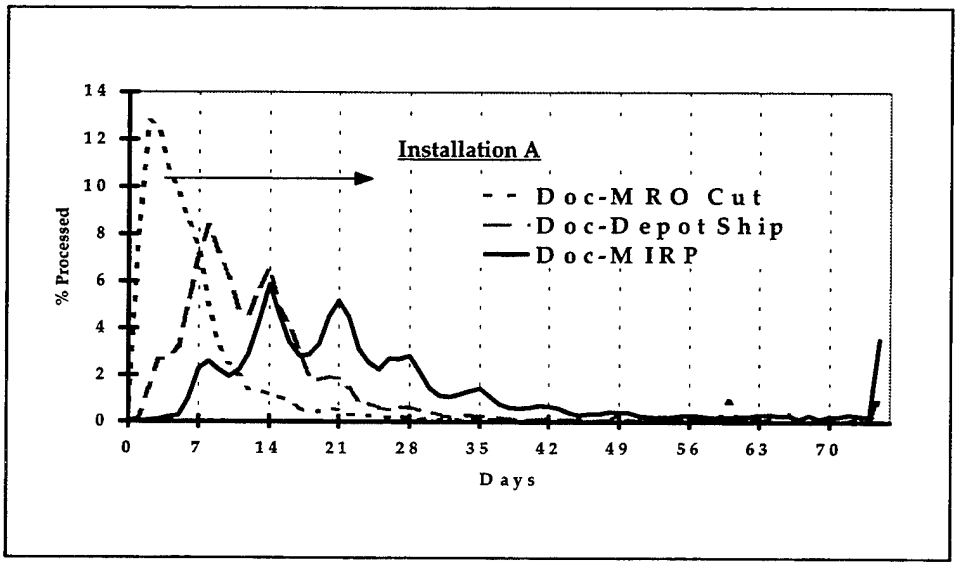


Figure C.2--Periodicity Becomes Apparent as the Segments are Accumulated

number of records with valid TK4 entries (to establish measures for CRP receipt and DSU receive), the final segment added in Figure C.2 is from depot ship to MIRP. Hence, the heavy solid line in Figure C.2 is the overall OST curve for installation A (document date to MIRP). Figure C.2 suggests that the final four segments (which involve shipping the materiel) amplify the seven-day periodicity.

To further investigate the periodicity, we used convolution[1] to see if the overall performance given in Figure C.1 can be predicted from the distributions associated with each of the individual segments (i.e., document date to establish date, establish date to MRO cut, etc.). Figure C.3 shows the result if the individual segments for low-priority[2] requisitions at installation A are combined using convolution (similar results occur for other priorities and the other data extracts). Convolution, which assumes independence of the segments, results in a smooth curve that does not match up at all with the periodic peaks and valleys associated with the actual measurements. This suggests that attributes other than priority need to be accounted for when convoluting the segments.

---

[1] Convolution is a mathematical method for combining individual functions or distributions into a single cumulative function. It can be thought of as a special kind of integration. In this case, convolution is used to compute the distribution of a sum of segment times from the distribution of the time spent in individual segments.

[2] Because the shape of the overall response time (document date to MIRP) varies by priority, each segment was convoluted by priority.

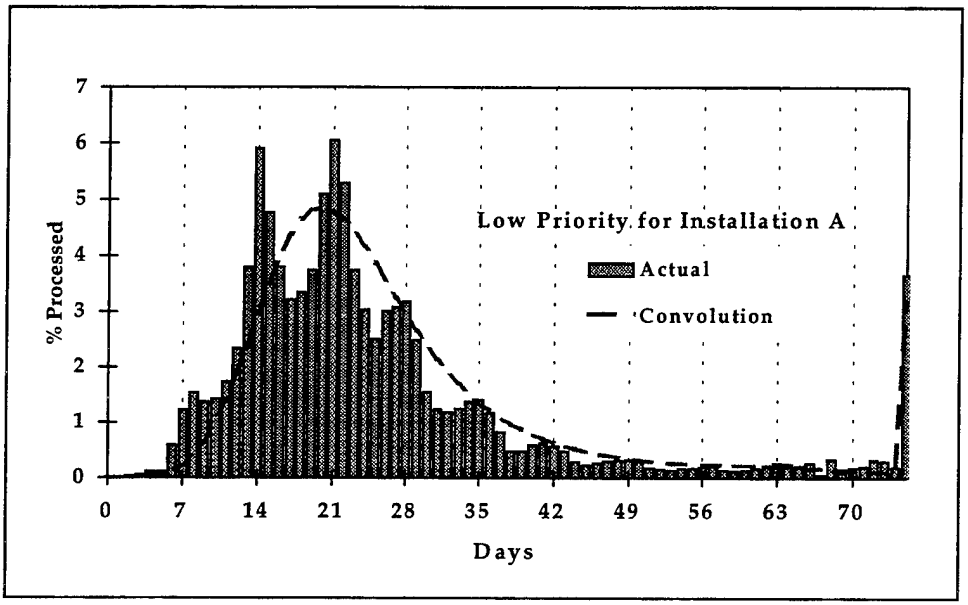


Figure C.3--Convolution by Priority Only Does Not Predict the Periodicity

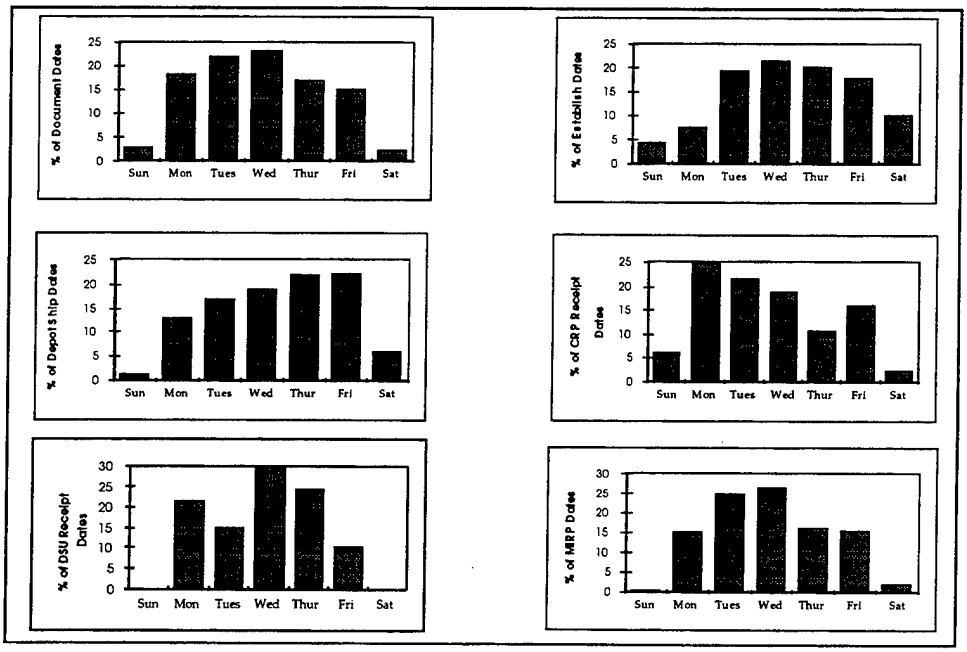


Figure C.4--Activity by Segment by Day of the Week

The seven-day periods suggest that a weekly cycle is involved. Figure C.4 plots the activity level in each segment by day of the week for all of the 175,000 requisitions in the installation A data extract. Though the samples are smaller for CRP receipt and DSU receive (because of missing entries associated with TK4s and TK6s), Figure C.4 clearly displays the reduced activity level on weekends in each segment.

Figure C.5 differentiates the OST based on the day of the week associated with the document date. Only Mondays and Fridays are plotted, to highlight the fact that day of the week does affect the OST. The seven-day periods associated with limited activity on the weekends are apparent. When all the days of the week are plotted, the peaks and valleys associated with each day result in the peaks and valleys in Figure C.1. Figure C.6 demonstrates that the response time of each of the six segments, which appear smooth when all the days are combined, is also affected by the day of the week (again, only Monday and Friday are plotted).

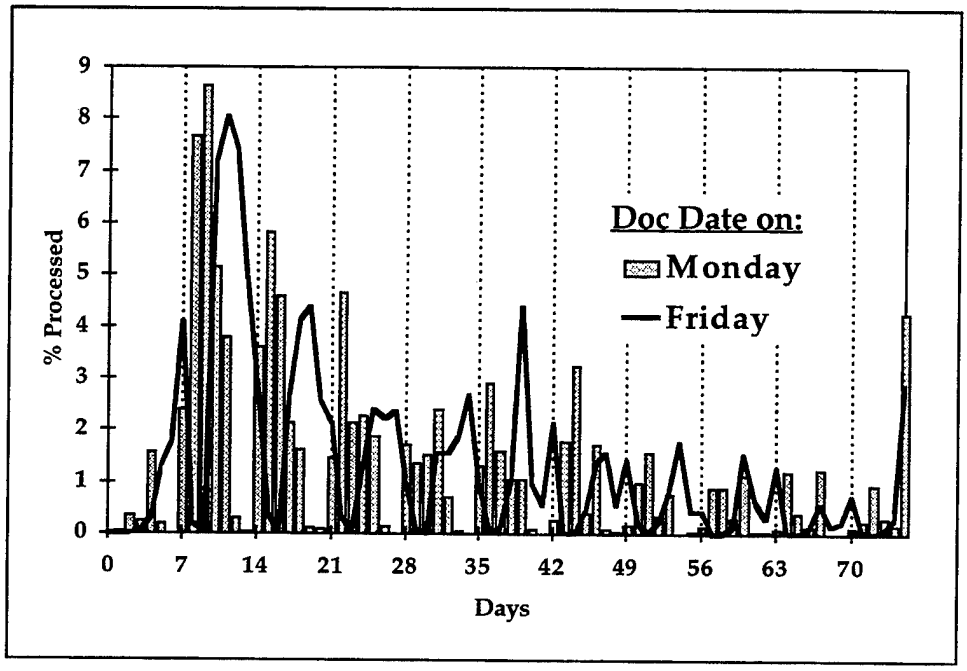


Figure C.5--OST Is Influenced by Day of the Week

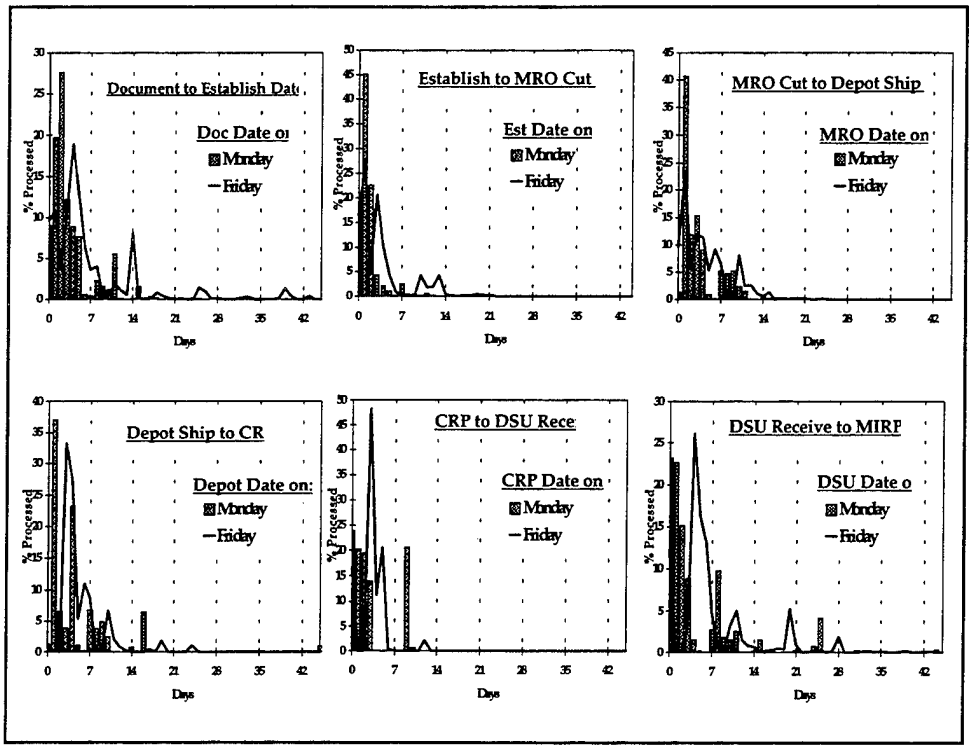


Figure C.6--Response Times for Each Segment Are Affected by the Day of the Week

Because the response time of each of the segments is a function of the day of the week, we performed another convolution that differentiated the segment response times not only by priority but also by day of the week. For example, for the segment document date to establish date, requisitions with document dates on Mondays were accumulated with a different distribution than requisitions with a document date on Friday (as is apparent in the upper left graph of Figure C.6). The same is true for other days of the week. The differentiation by day of the week was carried forward in the logic of the convolution, so that at each segment, the distribution for the appropriate day of the week was used. For example, if the probability is 0.3 that a document on a Monday completed the segment from document date to established date in three days, then that probability was integrated with the response for a Thursday establish date in the next segment (establish date to MRO cut). Figure C.7 displays the results of this convolution. Although there are some differences, suggesting that segments even

differentiated by day of the week and priority are not independent,[3] the convolution does predict the periodicity of the actual measurements.

The periodicity analysis suggests that weekends will continue to affect the overall response time and variability of OST. While a cost-benefit analysis should be undertaken to evaluate means of reducing the effect of weekends on OST, it is also apparent that steps to reduce the OST in both mean and variability in each segment can improve performance without changing activity levels on weekends. For example, reducing the typical OST for a requisition from 27 to seven days would reduce the number of weekends that currently inflate the OST (i.e., saving working days eventually also saves weekend days, during which little activity occurs).

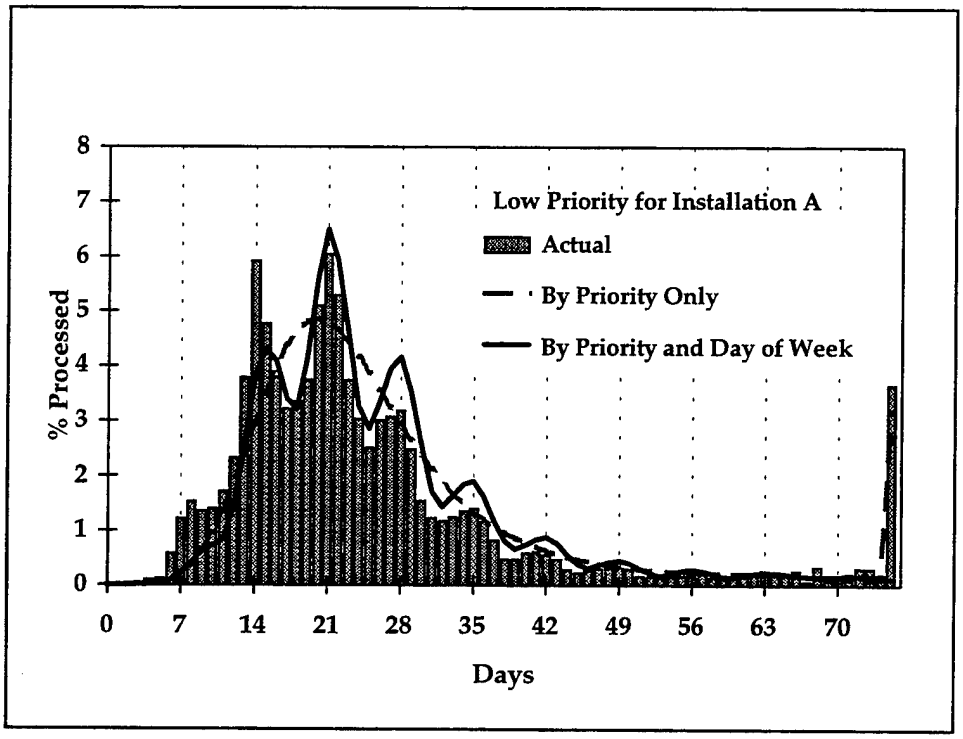


Figure C.7--Convolution by Day of the Week Predicts Periodicity

[3] For example, the inability to predict the first peak at eight days suggests that requisitions that are early in the distribution of one segment may be correlated with requisitions that are early in other segments.