Appendix A

# VELOCITY MANAGEMENT

Velocity Management (VM) is an Army initiative to dramatically improve the performance of logistics processes (e.g., order and ship, repair, stockage determination, and financial management). VM was initiated in January 1995 by the Army's logistics "Triad"—the Deputy Chief of Staff for Logistics (DCSLOG), the Deputy Commanding General of Army Materiel Command (DCG AMC), and the Commanding General of Combined Arms Support Command (CG CASCOM). The CG CASCOM serves as the Executive Agent for implementation.[1,2] In this appendix, we briefly discuss what VM is; then, we look at the D-M-I components of the process.

## WHAT IS VM?

VM is a management program aimed at improving the Army's logistics processes, both in garrison and when deployed. Initially, the Army conducted a pilot implementation of VM at a few locations, but it is now implementing VM Army-wide. VM targets every segment of

[1]The Army has an extensive Web site devoted to Velocity Management: *http://www.cascom.lee.army.mil/vm/.* This site has many reports on VM metrics and progress in achieving goals.

[2]Recognizing the Army's success in achieving dramatically improved performance in logistics processes, the Marine Corps has adopted the VM approach, which it terms "Precision Logistics." Readers interested in comparing the Precision Logistics initiative to VM should seek out M. L. Robbins et al., *Measurement of USMC Logistics Processes: Creating a Baseline to Support Precision Logistics Processes*, Santa Monica, CA: RAND, DB-235-USMC, 1998. The Marine Corps Web site for Precision Logistics can be found at *http://www.hqmc.usmc.mil/ilweb.nsf.*

every logistics process with the goal of getting logistics support to the soldier when it is needed. It works by finding and eliminating the sources of delay and undependability in the various processes. It requires logisticians to measure their performance carefully so they can better support their customers and ultimately the field commanders.

This program makes a major change in how the Army does its logistics business. Traditionally, the logistics system has been thought of by function, e.g., ordnance, transportation, and quartermaster. Some have described these functional lines as "stovepipes" because they focus only on a narrow set of activities. The problem with functional management is that it is hard to address problems that cross functional boundaries. By contrast, VM looks at logistics by process (e.g., the processes of ordering and receiving a spare part or repairing a piece of equipment). Processes cut across functions. VM can be thought of as managing logistics by process, with an emphasis on streamlining the processes to improve their "velocity." In addition to reducing the time it takes to perform basic processes, VM is also concerned with improving quality and lowering costs. Many changes to streamline processes also improve quality and save money.

VM has the support of the Army leadership. A coalition of more than two dozen senior logisticians headed by the DCSLOG oversees it, and this coalition is called the Velocity Group (VG).[3] The VG is implementing VM across the Army by using two different types of teams. One type of team is called a Process Improvement Team (PIT). It focuses on processes that cut across Army installations and organizations (and joint providers like the DLA) such as the order-and-ship process. Currently, there are five PITs: Order and Ship, Repair, Stockage, Financial Management, and Transportation. Another type of team, called a Site Improvement Team (SIT), focuses on logistics processes at a single location, such as an installation or repair depot. This two-tiered organization is designed to implement VM as rapidly as possible by improving processes at and across installations simultaneously.

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[3]This coalition has been one of the key factors in the success of the logistics process improvements achieved through the VM initiative. It is notable that the coalition has not had strong support from the Army's financial community, and few of the recommendations from the VM FM PIT have been acted upon.

## HOW DOES THE VM D-M-I PROCESS WORK?[4]

Conceptually, the VM approach to improving the performance of logistics processes involves three steps: (1) define the process you want to improve, (2) measure the process performance, and (3) improve the process. Although simple in concept, each of these steps can be difficult in practice. For the definition step, each process has to be broken down into subprocesses and activities. Then, the performance of the process has to be measured in terms of time, quality, and cost, which might require developing measurement standards and data sources. Identifying feasible and affordable ways to improve the process can pose its own set of challenges. Here, we briefly describe the three process components.

### Step 1: Defining the Process

The first step in defining a process is to determine who the customers are and what outputs (products, services, information) they want, what inputs are needed to produce these outputs, and how the inputs are transformed into the outputs. Defining a process at a useful level of detail usually requires the PIT to undertake a "walkthrough" of the process under review. During the walkthrough, it is common for participants to gain new knowledge about and new perspectives on each step and activity in the process. It is especially enlightening to see how policy is translated into practice, how local standard operating procedures (SOPs) vary and with what effect, and how individuals who perform various steps in the process view each other's performance.

The outputs of a process can be parts, forms, or other materiel or information. For each output, the PIT must identify the customer. The identity of customers becomes important later as the PIT works with customers to establish improvement goals (e.g., quality measures). A key goal for improving the Army logistics system is better support to the customer. The ultimate customers of the system are the

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[4]This subsection draws heavily on unpublished RAND Arroyo Center research by John Folkeson, Rick Eden, John Dumond, and Jerry Sollinger entitled "Velocity Management Implementation Guide." For more details on specific process improvments, refer to the works in the bibliography by Dumond, Eden, and Folkeson (1995), Edwards and Eden (1999), Girardini et al. (1996), and Wang (2000).

commanders and the soldiers in the field. However, the internal customers of each process and segment must be satisfied if the ultimate customers are to be served.

Next, the PIT identifies the inputs to the process. It can be difficult to identify all the inputs to a process. Inputs can be materiel, information, money, or something else. For example, a prescribed load list (PLL) clerk processing a requisition using the Unit-Level Logistics System (ULLS) requires input from a mechanic such as forms and signatures. The providers of each input also need to be identified, e.g., mechanic, motor sergeant, battalion maintenance officer (BMO).

As inputs, outputs, providers, and customers are identified, typically the logistics process at hand begins to look exceedingly complex. Frequently, it becomes evident that the roles of customer and provider and the relationships among the organizations that play these roles may not be straightforward. The customer of an output may also be the provider of some inputs. For instance, the mechanic who wants a part is both provider (the order to the PLL clerk) and customer (the person who finally receives the part). One of the goals of this step of the implementation is to track and recognize these relationships. Any of them may be the source of a problem that is hindering the performance of the process as a whole. A good indicator of an opportunity for process improvement arises if the PIT cannot identify a customer for a subprocess or an output. If an output has no customer, it may be unnecessary.

The final task of the definition step is to map the process that turns inputs into the desired outputs. This step can be difficult to get started and can become unmanageable because of complex interactions. The process map helps the PIT to visualize the process and promotes shared understanding during team discussions and problem solving.

### Step 2: Measuring the Process

After a process has been defined, the next step for the improvement team is to measure how well the process is currently working. The VG has identified three dimensions of process performance to measure: time, quality, and cost. Measuring the process includes determining how to measure performance (i.e., "what is goodness"),

establishing the baseline performance level for each dimension, and setting goals for improvement. Figure A.1 illustrates some of the tasks necessary for initially measuring a process. The remainder of this section discusses the process shown in the figure in more detail.

**Defining metrics.** To measure a process, the PIT must identify or develop metrics for each dimension of performance. For instance, metrics of time for the repair process might include total repair cycle time (from the time the item is determined to be broken to the time when it is repaired and available for use). A metric of quality for the order process might be the number of rejected requisitions.

Time is probably the most straightforward dimension of performance to measure for many processes. However, it is important for the PIT to develop a consensus on the definition of the process before it develops metrics. When does the process actually start? When does it end? The time measurement should be continuous; that is, the ending point of one segment becomes the starting point of the next. The PIT must communicate with providers and customers to make sure that there are no gaps where responsibility has not been explicitly assigned. All of the time needed to complete a process must be accounted for, and someone should be responsible for reducing it. In particular, someone must be accountable for reducing the time that needed information or materiel simply waits to be moved or processed.

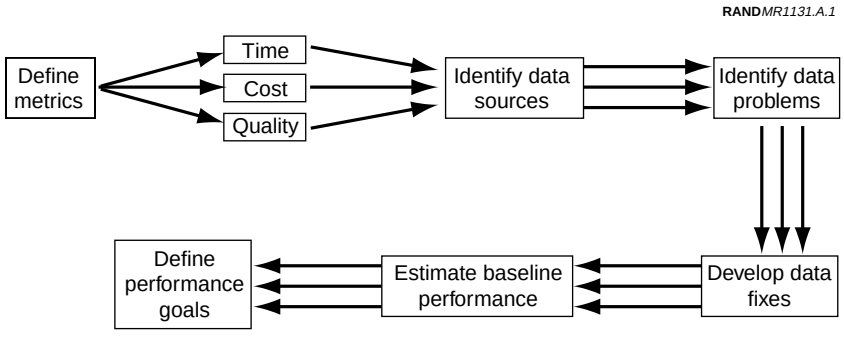


**Figure A.1—Initial Tasks in Measuring a Process**

Quality metrics are more difficult to develop because, unlike time metrics, they must be defined in terms of the specific output. Customer needs and value judgments drive the definition of quality. High quality means one thing for a repair, and another thing for a shipment. Which characteristics of the process output does the customer value most? How well do customers think the process is performing? What is the quality of the inputs to the process?

Cost can be difficult to measure because current military accounting systems have been set up to track expenditures by congressional appropriation category rather than by traditional cost accounting or activity-based accounting approaches. The current system is designed to ensure that funds are spent for the reasons Congress appropriated them, not to measure costs and relate them to performance.

To evaluate process performance, however, it is important to identify the true comparative cost to the Army. The goal should be to evaluate improvement proposals and track performance over time using true comparative costs, the total cost to the Army. The appropriation category of the funds spent is relevant, but a process may require funds from many different categories. For example, the pay of civilian workers and military personnel comes from different appropriations, but in tasks where they are interchangeable, both types of costs are relevant in determining the total cost to the Army to provide the product or service. The accurate costing of resources is a difficult issue, because different types of costs may be recorded in different automated systems or databases.

Metrics should be selected that provide insight into the variability of performance, as well as the average performance of a process, because one goal of process improvement efforts will be to reduce such variability. For instance, in measuring order-and-ship time (OST), the Order and Ship PIT moved away from the traditional metric of average or mean OST to a set of metrics. Instead of simply using the "mean," they measured the 50th (median), 75th, and 95th percentiles of OST. These metrics permitted them to focus on improving not only the speed but also the dependability of the order-and-ship processes.

**Determining the availability and adequacy of data.** Once a process metric has been defined, the next step is to determine whether adequate data are available to measure it. This means identifying specific

data sources; if more than one data source is available or will be needed, it will be necessary to consider how data from each will be reconciled or combined.

**Identifying data problems and solutions.** In some cases, the measurement data will not be available or some data will be of poor quality. For instance, the PIT may be interested in the performance of a segment that is not currently measured, such as the time from when a fault is first observed by the operator of a weapon system to when it is first reported.

The PIT must identify such data problems and eventually develop a solution for each. Solutions can vary widely in acceptability. In some cases, both a short-term and a longer-term solution may be needed. For instance, the PIT might have to set up a team to review and correct data by correcting mistakes, filling in missing entries, and so forth. For the longer term, the PIT would want to fix the data-entry problem by educating users or by making the data-entry process more user friendly or foolproof. The PIT may want to identify additional data-collection points for future modifications of the appropriate Army information systems.

It is essential that the PIT quickly establish some method, even if imperfect, for measuring the performance of the process on each process metric—time, quality, and cost. If data are not identified and a regimen for analysis is not developed, it will not be possible to accomplish the next step, improving the process.

**Estimating baseline performance on each dimension.** Establishing the current (baseline) performance of each process is an important early task. The baseline dataset should cover a long-enough period of time—for most processes, a year suffices—to display seasonal and other recurrent variations in performance levels. This baseline provides a basis for two important comparisons. The first is a comparison against the goals for the performance of the process. For example, the Army set a 7- to 10-day maximum goal for OST (for active units' requisitions from CONUS to the wholesale supply system) against the baseline of over 25 days on average. Where the goals and the baseline performance do not differ, either no improvement is needed or the goals need to be revisited. With continuous improvement, goals should become more challenging as progress is achieved. The second

comparison is one of baseline performance against performance of the process once changes have been introduced. As time passes, it should be possible to document a trend of continuing improvement through the implementation of initiatives. That is, performance should become continuously cheaper, better, and faster.

**Establishing goals for improvement.** For each process and on each metric, it is important to decide what level of performance is desired and to set challenging but achievable goals. Goal setting requires information from several sources. One source is the customer(s) of the process. However, customers may not be the best judges of what they want if they do not have a good understanding of what is possible. Another source of information is benchmarking, i.e., determining the level of performance that other organizations, including commercial ones, are achieving in similar or comparable activities. Can a HMMWV be repaired on post as fast as a car is repaired off post? Benchmarking focuses on organizations considered high performers that reflect the state of the art in what is technically feasible. It is not necessary to go to the commercial sector for a benchmark; the best performance of the process at another Army organization can be used as a benchmark. For example, a neighboring unit that consistently gets all its Class IX requisitions off post in less than six hours can be a benchmark for other units on an installation.

Where current baseline performance is determined not to meet the goals for improvement, the PIT proceeds to the third step, improving the process.

## Step 3: Improving the Process

Almost everyone who is working in a process or who is the customer for a process can suggest improvements to that process based upon his or her individual experiences. The structured approach presented here is intended to help think systematically about how to develop, implement, and monitor suggestions for change. Often, "improvements" are implemented when there are little or no performance metrics in place, and it is impossible to determine whether they achieve their intended goals. Both functional expertise and creativity are needed to develop improvement proposals. Leadership at all levels is required to implement a proposed change successfully.

**Target improvement efforts.** Having defined a logistics process and established the baseline performance measurement, the PIT can now begin to analyze the process and determine where improvement efforts should focus. There are several strategies to consider at this stage of the improvement process. First, the PIT can look for "low-hanging fruit"—that is, obvious opportunities for improvement that can be achieved easily and quickly. These may be activities that can simply be eliminated (e.g., repetitive approvals) or procedures that can be adjusted with great effect (e.g., synchronizing batching of computer runs or ensuring that parts requests get entered or delivered so they get into the wholesale system as soon as possible).

Second, in attempting to maximize the leverage of early efforts, the PIT should focus on the segments with the "largest" potential savings first. Largest can be defined along any metric—i.e., time, cost, or quality. If significant improvement can be achieved in these large segments, the process as a whole will be affected in evident ways. These lucrative targets are usually exposed during the previous steps.

Third, the PIT can consider focusing on improving the quality of inputs to the process. This is likely to be a fruitful strategy if the early segments of the process seem to be the most problematic. For instance, a local repair process may run smoothly once truly broken parts have been identified, but technicians may be spending a lot of time determining which parts turned in for repair are not actually broken. This type of process improvement usually requires SIT members to work with input providers.

**Develop alternative solutions.** For each of the targeted segments, the PIT should propose one or more alternative solutions it believes would outperform the current design. Alternatively, if the process seems hopelessly complex in its design or if most rather than some segments show problems, the PIT should consider redesigning the end-to-end process from scratch. Again, the PIT should produce one or more alternatives that it believes will outperform the current design. It is important for the SITs to coordinate their activities with the appropriate PIT when implementing local process improvements so as not to waste effort on alternative designs that have already been discussed and accepted or tested and rejected elsewhere.

**Implement alternatives.** Once a preferred alternative has been identified, it must be implemented across installations. Both PITs and SITs should be prepared to help in that implementation. Ideally, the SIT will be able to implement most of the changes with the support of their local leadership. However, where implementation is beyond the ability of a SIT, then the PIT or the Army's change agents can assist installation personnel.

**Monitor and report improvements.** Once the change has been implemented, the process needs to be measured so that improvements can be documented and tracked. Performance measurement is the prerequisite to the next round of continuous process improvement. Organizations that have worked through this improvement cycle a few times have consistently reported dramatic cumulative results and have come to recognize the critical importance of measurement to their efforts.