Improving the probability of effective organizational change in the Coast Guard through the combined use of System Dynamics and Enterprise Value Stream Mapping & Analysis

By

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Submitted to the System Design and Management Program
In Partial fulfillment of the Requirements for the Degree of

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ABSTRACT

Most major organizational changes never reap the benefits the original planners envisioned, they often take longer to implement than expected and in a dynamic environment that can spell disaster for a large enterprise. The Coast Guard is in the midst of several major organizational changes while planning several more. This thesis will use two powerful analysis tools to make policy recommendations that may lead to greater success in the implementation of change. The two tools are Enterprise Value Stream Mapping Analysis (EVSMA) and System Dynamics (SD).

Chapter 1 is a more detailed introduction into the motivation behind this thesis. Chapter 2 will review a brief history of some of the major changes within the Coast Guard. Chapter 3 recapitulates some studies conducted in the business sector, with respect to organizational change. This chapter also explains some basic System Dynamics concepts to better contextualize the business cases mentioned. Chapter4 describes the Enterprise Value Stream Mapping Analysis of the Coast Guard First District. Chapter 5 develops causal loops that attempt to model the dynamics of change within the Coast Guard. Chapter 6 describes some policy recommendations based on the lean enterprise evaluation and the system dynamics model we developed. Chapter 7 summarizes some lessons learned and then proposes further studies.

Thesis Supervisor: Nelson Repenning
Title : Associate Professor, Sloan School of Management

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The other special group is of course the many individuals in the United States Coast Guard who willingly participated in the study and also provided valuable feedback on my thesis as we began to develop the system dynamics models. In particular, Captain Scott Keene, CDR Peter De Cola, RADM Breckenridge who not only listened but provided helpful examples that supported the theory proposed. Also the members of the Logistics Organizational Alignment Team who welcomed us as advisors to their study, valued our engagement throughout the entire process and included our recommendations with their final report.

Finally, I would like to thanks my family whose patience and love served as a solid foundation through the most challenging of times and whose constant encouragement fueled many late hours of reading, writing and analyzing.

CHAPTER 1

Introduction

Admiral Allen, in his *State of the Coast Guard Address* in 2007 stated:

> "The Coast Guard has never been more visible or heavily relied upon by the nation they serve than they are today. The world we operate in is not static; it has changed dramatically in recent years and the Service must transform and adapt along with it. The practices of the last century, upon which the current organization was designed, are not adequate for today's world. The Coast Guard's organizational structure must transform to keep pace with today's dynamic joint operating environment, the command and control structures, support systems, and business practices must be modernized and transformed to keep pace with the rapid growth and significant expansion of their diverse responsibilities. The Coast Guard needs to become more agile, flexible, and responsive. Specifically, they need to do three things:
>
> -make the Coast Guard more responsive to the needs of our nation.
>
> -make workforce structure more responsive to mission execution.
>
> -and, make our support systems more responsive to our operators. "

These goals are in direct alignment with the goals of a lean enterprise. In a lean enterprise, waste and redundancy are reduced or eliminated, interactions between departments are optimized and there is a tight alignment between stakeholder values, metrics, processes and strategic objects. This leads to more productivity and higher performance with the same resources, the ultimate goal of the Coast Guard leadership. This thesis assess the current Coast Guard organization, or a microcosm of it, utilizing the Enterprise Value Stream Mapping and Analysis (EVSMA) tools developed as part of the Lean Aerospace Enterprise Initiative. These tools offer a method to determine where an organization is, where it wants to go, and how to build a bridge to get there. The lean enterprise analysis was relevant for the first and second steps, but building a strong bridge, requires understanding all the forces (seen and unseen) that will act on it. The transition or implementation of organizational change is that bridge. While researching this thesis, several predominant philosophies were identified. Many believe that, to

implement change, simply requires following a few prescribed steps, and when a change fails a step must have been missed. This linear thinking was found to be a less than adequate explanation of some of the complexities that occur during any transition. Others believe that culture is the key to effective change implementation, but the research conducted for this thesis found that some units succeeded and some failed to change despite having the same culture. Still others say leadership is the answer, but successful, proven leaders who have excelled in some organizations have failed miserably in others. Which leads us to those that believe organizational structure is the key, but this study found units with the same structure that implemented the same change and, again, some succeeded and some failed. This thesis poses that it is the interaction of all of these forces and more, in a complex system of feedbacks, delays and inputs, which is the answer. System Dynamics (SD) was used to model these interactions in the hopes it would lead to better policy decisions and, ultimately, a more successful organizational change into a lean enterprise.

The Coast Guard has gone through several major organizational changes. Some were extraordinarily successful, while it is not readily apparent whether others have ever reaped their advertised benefits. Most of the changes took longer than expected. From Admiral Allen's statement, it is clear that the Coast Guard is looking to become a lean enterprise: more flexible, more responsive with improved performance. A couple of questions arose naturally from these observations, in particular: what can be learned from the organization's history and from other organizations that have attempted similar changes?

The evaluation of several business cases revealed that, regardless of how good the analysis or the implementation plan is, if there are strong underlying dynamics that reinforce no change or somehow limit the efficiency of change, the program will not be as effective as possible and, therefore, the results will be less than expected. The essence of this thesis is to propose that, much like in the business sector, in order to effectively change and truly reap the benefits of change, one must understand the system dynamics of change within the enterprise. Here, an attempt to analyze and apply many lessons learned from effective and not so effective organizational change in industry is presented.

The Coast Guard has performed studies in the past and made plans to reorganize based on quality data and comprehensive plans before; yet, they have rarely fully implemented the changes required. Furthermore the time necessary to reach some normalcy is often much longer than planned and the benefits fluctuate from widely successful to questionable. Why is the organization preparing to reorganize again in the midst of a rising demand for services, tightening budgets and on-going recovery from the last major organizational change? What are the endogenous dynamics that will affect the success of this change within the Coast Guard?

Enterprise Value Stream Mapping and Analysis (EVSMA), along with System Dynamics (SD) tools, will be used to review historical data and the current state within the Coast Guard as

it relates to organizational change. The data will be compared to the current and similar studies in industry on the effectiveness of organizational change. Extensive surveys, interviews and focus groups will be used. Research from articles and theses related to the effectiveness of organizational change in the commercial industries, as well as the Coast Guard, will also be used, along with some SD studies and lessons learned from the lean aerospace initiative.

Everyone's desire is to improve the logistics system within the Coast Guard. There are many ways that this can be done; lean enterprise methodology is a comprehensive analysis that takes a holistic view and ensures alignment between the value of all stakeholder, strategic objectives, processes and metrics. It also optimizes processes based on value rather than bureaucracy and has been proven to improve performance when implemented effectively.

Regardless of the methodology, change will be required, and improving the ability to effectively change, to bridge the gap between here and there, is the essence of this thesis. Using SD models developed in this thesis, policies can be viewed from a systems level before implementation to ensure all desired effects and no undesirable effects occur. Combining the information learned during the lean analysis of the current state and the SD model of change implementation in the Coast Guard, we attempt to make some policy recommendations and explain their rational from both points of view (LE & SD). This thesis proposes that these two tools together greatly improve the chances of success for organizational improvement.

CHAPTER 2

Coast Guard History, a Story of Change

In 1790, the First Congress of the United States established a small maritime law enforcement agency to assist in collecting the new nation's customs duties. For the next 8 years, the Revenue Marine (later called the Revenue Cutter Service) was the nation's only naval force, and as so, was soon assigned military duties. Over time, the Revenue Cutter Service acquired new responsibilities and either merged with, or absorbed, several other federal agencies (Coast Guard Publication 1, 2002). These were all significant organizational changes that history says went extraordinarily well and left a legacy within the Coast Guard of flexibility, a general acceptance of change and a strong drive toward mission accomplishment.

The result of these many mergers and melding of responsibilities is today's Coast Guard. The service received its present name in 1915 under an act of Congress when the Revenue Cutter Service merged with the Life-Saving Service. The nation then had a single maritime service dedicated to saving life at sea and enforcing the nation's maritime laws. The Coast Guard began to maintain the country's aids to maritime navigation, including operating the nation's lighthouses, when President Franklin Roosevelt authorized the transfer of the Lighthouse Service to the Coast Guard in 1939. Later, in 1946, Congress permanently transferred the Bureau of Marine Inspection and Navigation to the Coast Guard, thereby placing merchant marine licensing and merchant vessel safety under the Coast Guard's purview (Historian, 2007).

Coast Guard Organizational History Overview
Source: (G-IPA, 2007)

7 Aug 1789	U.S. Lighthouse Service established under the control of the Treasury Department
4 Aug 1790	Congress created *Revenue Cutter Service* under the Treasury Department; considered the birth of the modern Coast Guard.
7 Jul 1838	Steamboat Inspection Service established under the Justice Department
30 Aug 1852	Steamboat Inspection Service established under the Treasury Department
18 Jun 1878	U.S. Life-Saving Service established under the Treasury Department
5 Jul 1884	Bureau of Navigation established under the Treasury Department
14 Feb 1903	Bureau of Navigation and Steamship Inspection Service transferred to newly created Department of Commerce and Labor
28 Jan 1915	Life-Saving Service and Revenue Cutter Service combined to form the Coast Guard
6 Apr 1917	Coast Guard transferred to Navy Department control.
28 Aug 1919	Coast Guard reverted to Treasury Department
30 Jun 1932	Steamboat Inspection Service and Bureau of Navigation combined to form the Bureau of Navigation and Steamboat Inspection

1 Jul 1939	Lighthouse Service became part of the Coast Guard
1 Nov 1941	Coast Guard transferred to Navy Department control
28 Feb 1942	Bureau of Marine Inspection (formerly the Bureau of Navigation and Steamboat Inspection) transferred temporarily to the Coast Guard under Navy Department control.
1 Jan 1946	Coast Guard returned to Treasury Department control
16 Jul 1946	Bureau of Marine Inspection was abolished and became a permanent part of the Coast Guard under Treasury Department control.
1 Apr 1967	Coast Guard transferred to the newly-formed Department of Transportation.
1 March 2003	Coast Guard transferred to the newly-formed Department of Homeland Security

The Coast Guard grew into a multi-mission military service that is the federal government's first responder for many issues. The chart below, taken from Coast Guard Publication 1, 2002, gives a graphic depiction from a national fleet perspective of the missions in relation to the Department of Defense's Navy.

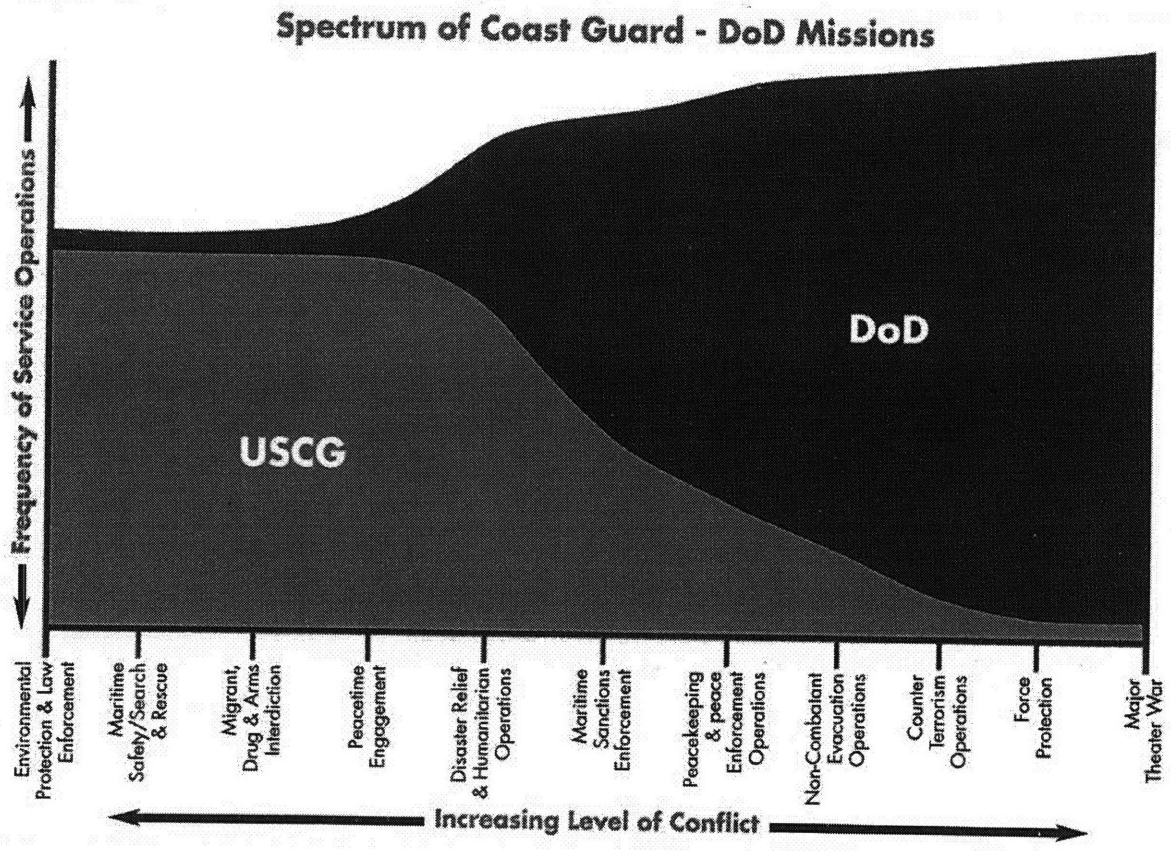

Figure 1-CG Missions (Coast Guard Publication 1, 2002)

On an average day, the Coast Guard will save 15 lives, assist 114 people in distress, protect $4.9 million in property, interdict 26 illegal migrants at sea, inspect 23 waterfront

facilities, conduct 82 search and rescue cases, seize $2.4 million worth of illegal drugs and respond to 11 oil/hazardous chemical spills (CG-092, 2007). It does all of this with fewer than 50,000 people and a budget of approximately 5 billion dollars. This organization operates with less than 2 percent of the combined multibillion-dollar budget of the other four military services, or less than the cost of one new aircraft carrier (Phillips & Loy, 2003). It is known as one of the best run governmental agencies and has demonstrated an ability to change and excel in the most dire of circumstances. This claim is supported by a rigorous 1999 Government Executive evaluation in which the Coast Guard was just one of four agencies to receive an overall grade of "A" out of the 27 federal agencies studied (McAllister, 2004). However, every change has not been a total success, and it often took much longer than predicted for the organization to embrace a new paradigm. It is always more instructive to look at those things that did not go as planned, as opposed to successes, for valuable lessons.

In September 1986, the Commandant convened a special project team to develop an implementation plan to realign the Coast Guard's support structures in order to consolidate functions (Gilbert, 1986). Before the Gilbert Study, logistics personnel were embedded within operational commands, which resulted in a lot of overhead, a lack of configuration management and a very responsive support team. The proposal put forward by the Gilbert Study followed the propositions by Drucker and Grover Sterling in "Managing the Public Sector" (Gilbert, 1986) in that (a) results-producing activities should never be subordinate to non-results producing activities, (b) support activities should never be mixed with results-producing activities, and (c) top management activities are incompatible with other activities.

An assessment of the applicability of these principles will not be undertaken here,, rather this thesis focuses on the size and scope of the change the principles brought about in the organization. This thesis points out the fact that the new changes currently under contemplation address these same issues of optimizing logistics support.

A more recent major organizational change was addressed in Catherine Kang's (2006) thesis *The U.S. Coast Guard Sector Construct: A Study of Organizational Culture.* In this thesis, Kang analyzes the melding of two distinct cultures within the Coast Guard: the operators and the regulators. Many believe that these two sub-cultures have existed since 1942, when the Bureau of Marine Inspection was absorbed within the organization. Kang acknowledges the "get the job" done mentality of the everyday "Coastie" (Coastguardsman or woman). She shows that most believe that this mentality is beneficial for the mission and are therefore committed to making it work. She also notes that the method of implementation is based on some faulty mental models, and that a systems approach to viewing the change would avoid many of the "side effects" that have been discovered and have caused problems for the organization during this major transition. Terms such as "side effects", mental models and systems approach led us to use SD as a tool for analyzing the change process within the organization. More regarding SD will be discussed later.

The 1986 Gilbert study and several other minor changes since have led to the organizational structure depicted below. It separated out the logistics personnel from the operators and created the Maintenance Logistics Commands (MLCs) and their subordinate units, along with some of the Headquarter's units. From this structure can be seen that the latest change of combing the Groups and Marine Safety Offices created Sectors, the focus of Kang's 2006 thesis.

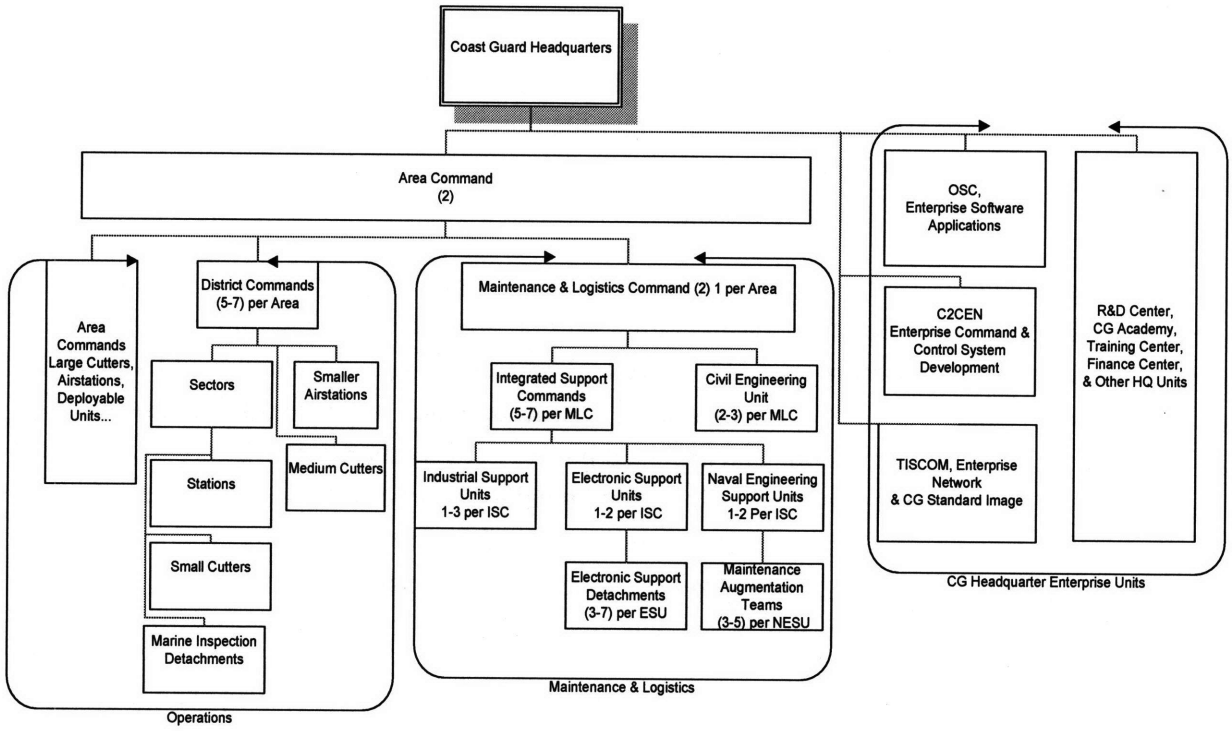

Figure 2-Coast Guard organizational chart

As noted here, the Coast Guard is regionally based. Headquarters is located in Washington DC, to facilitate interactions with the Presidential Administration and the Department of Homeland Security's staff. Several commands work directly for the Coast Guard and provide enterprise-wide services, such as personnel command, training centers and the like. The United States is broken into two areas, east and west. Each Area Commander has several districts that work for them, as well as one Maintenance and Logistics Command (MLC). In the simplest of terms, the districts control the assets and people that interact with the public and perform the mission, while the MLCs control the people and assets that are needed to support the district and their units. This structure will be explained in a little more detail later, as we begin the case study of the First District Integrated Support Command. It is sufficient to note here that the Gilbert study did lead to a separation of logistics, or the support structure, from the operators, or results-producing organization. The latter change created Sectors. The goal of the "Sector Construct" is to have one single person responsible within a certain region for all operations. Previously, there had been "Groups" which coordinated the stations and primarily conducted

maritime law enforcement and search and rescue operations. There were also "Marine Safety Offices", which did marine inspections, oil clean ups and mariner licensing. These two separate units where combined after the tragic events of September 11th, 2001, to bring about better coordination between the two units and reduce some overhead.

As stated earlier, the reason we mention the Gilbert Study is that the next major change addresses the same issue of faster, more responsive logistics. During our analysis, we also conducted a survey and found that, according to the operators, **69%** of the support they received was from their operational chain and not the logistics side of the organization. So, was the implementation a success? Even though the boxes moved, did the actual structure change as expected? Many believe the next proposed plan is merely the conclusion of the Gilbert Study which was never fully implemented some 20 years later. How and why is this possible?

CHAPTER 3

The Effectiveness of Change in Business

Paul Strebel of the International Institute for Management Development suggests that success rates for practitioners of corporate reengineering are well below 50%, and are perhaps as low as 20% (McAllister, 2004). This finding is supported by the work of Douglas Smith (1996), who observes that "studies consistently report no more than a fifth to a third of the reengineering, total quality, core competencies, downsizing, learning organizations, strategies and other significant new programs...achieve their performance aspirations" (Smith, 1996).

"The combined expenditure of U.S. companies on management consultants and training in 1997 was over $100 billion, and a sizable fraction went towards efforts to develop operational capabilities matching those of the best firms" (Repenning & Sterman, 2001). Despite the vast expenditures, and notwithstanding a few well dramatic successes, few efforts to implement improvement programs actually produced long term significant results. The Total Quality Management program became popular in the 1980s. By the mid-1990s, it had all the earmarks of a management fad. There was an initial burst of enthusiasm, a flurry of activity and then a steady decline. From this it might be easy to presume that TQM was not effective. (Repenning & Sterman, 2001).

The Coast Guard was not immune to this drive for change. In 1990, the Coast Guard contracted out support to assist them through the major transition of implementing TQM Coast Guard-wide. The then Commander, now Vice Admiral, Vivien Crea's (1992) wrote a thesis entitled *The Implementation of Total Quality Management (TQM) in the United States Coast Guard in 1992, where she. .* outlined some of the problems encountered, as well as the strengths and weaknesses of the organization with respect to this particular change. Later discussion will show that some of the dynamics articulated in her thesis hold true even today.

"A number of careful studies have now demonstrated that companies making a serious commitment to the disciplines and methods associated with TQM outperform their competitors. There is now little doubt that, when used and/or implemented properly, TQM produces significant value to both organizations and their customers. Yet, paradoxically, it remains little used. A study found that fewer than 10% of Fortune 100 had well-developed TQM programs; and in another study, TQM fell from the third most commonly used business tools in 1993 to the 14th "(Repenning & Sterman, 2001). Total quality management is one of many movements in business strategy. TQM was followed by reengineering, then core competencies, matrix organizations, Six-Sigma and more. These and many others have been tried. Many failed. A few made tremendous strides in productivity because of them.

The challenge for today's leaders is not what to do. There are many tools and techniques available to improve performance. There have been extraordinary advances in information technology. There is an army of management consultants who can come in and teach all about what is working at other companies. They can even design a plan with which to reach your desired end state. The real challenge is how to successfully implement these changes; how to implement them in a fashion that is reinforcing and creates a culture that embraces needed change while increasing performance. Time and time again, the best implementation plans have gone array.

Looking at companies which have optimized their structure for success, Toyota, Dell, Southwest, IBM and others, it becomes apparent that there are no secrets to their successes.. All of these companies will give tours and lectures explaining how and why they do what they do. Consulting firms will tour them, write books and offer guidance on how to become like "name the corporation". However, it is clear that the replication of what goes on in these companies is not so easy. The below figure, taken from a study of 120 restaurants, demonstrates that knowing does not always equal doing. The question is, why not?

The Knowing Doing Gap

Differences between Knowing and Doing in 120 Units of a Restaurant Chain

Statement	We Know We Should Do This	We Are Doing This
Getting good ideas from other units in the chain	4.9	4.0
Instituting an active suggestion program	4.8	3.9
Using a detailed assessment process for hiring new employees	5.0	4.2
Posting all jobs internally	4.2	3.5
Talking openly about learning from mistakes	4.9	4.3
Providing employees with frequent feedback	5.7	5.2
Sharing information about your restaurant's financial performance with everyone	4.3	3.8

Note: Responses are rated on a six-point scale on which 1 equals "strongly disagree" and 6 equals "strongly agree." All differences were statistically significant at less than the .001 level of probability. Adapted from: Pfeffer, J and Sutton, R. (2000) *The Knowing-Doing Gap*, Harvard University Press.

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Table 1-Morrison's knowing and doing

One study (Morrison, 2003) completed on Harley Davidson in its attempts to become more Toyota-like, or implement their version of lean manufacturing, was studied in depth using SD. Some of the interesting comments made by the employees and staff were:

"This stuff's not rocket science, so why aren't we doing it?"

"This is just AFP, Another Fine Program."

"What scares me the most is how we are going to sustain this" (Morrison, 2003)

These comments are symptomatic of certain dynamics that go on in companies all the time that hinder change. Similar comments can be heard at the deck plate level within the Coast Guard. A common reason given for failures to implement change in an organization is resistance to change. There is a whole other set of explanations, such as "here is my recipe for change", like the eight-stage process of creating major change by Kotter and Cohen (2002):

1. Establish a Sense of Urgency
2. Creating the Guiding Coalition
3. Developing a Vision and Strategy
4. Communicating the Change Vision
5. Empowering Broad Based Action
6. Generating Short-term Wins
7. Consolidating Gains and Producing More Change
8. Anchoring New Approaches in the Culture ((Kotter & Cohen, 2002,p. 7).

The explanation for failure then becomes that a step "pick a step" was forgotten and, therefore, it did not work. There are other, more organizational feedbacks that companies will claim caused a program to fail. Not enough funding or too many changes at one time are common reasons articulated. There may be a lot of merit to these excuses, but this thesis proposes that there is a more complex explanation, and that, through SD, a better view of what that explanation might be can be gleaned and improved implementation strategies can be devised in response to these findings.

Are there dynamics on a personal level that limit the effectiveness of change, and are those dynamics applicable on a broader scale? The Harley Davidson study Brad Morrison (2003) describes gets more to the "deck plate" level, or the guy on the shop floor. What is most interesting is that the company had all the core requirements that one would believe should lead to a successful implementation. They had strong senior support, as well as strong union support. They had a sense of urgency. They had employee loyalty and worked in teams. They had also made some successful changes in the past, and so were aware that change was necessary to succeed. Probably the most critical aspect was that they had excess manpower because they had recently started outsourcing some portion of their work. Lack of resources, which are often a reason for failure in change programs, were not an issue here (Morrison, 2003).

Harley Davidson experienced initial success in the areas of process improvement, performance results and employee motivation. People were excited because of their great successes. Performance went up from 70% to 94% , scrap costs were cut by thousands of dollars and the whole process was more organized (Morrison, 2007). Six months later, things returned to the way they were before the program, but they seemed a lot worse because they had been doing better.

The dynamics were modeled and the performance replicated with the model, then inputs to the model were varied to run simulations. What they found was that only a slight difference in implementation would have gotten Harley Davidson past the tipping point, and performance would have continued on much like Toyota. Some liken it to a rocket escaping the atmosphere, too little and the ship is brought back down by gravity, but just enough can break the rocket free and the stars are in reach. The dynamics for Harley Davidson were perhaps particular to that company, but the idea of understanding the real patterns of behavior, feedbacks and "side effects" in the complex dynamics of the organization makes sense.

For more general results Repenning and Sterman (2001) studied several firms over a 10 year period and draw some conclusions as to how this "improvement paradox" is overcome. They conducted over a dozen in-depth case studies in industries, including telecommunications, semiconductors, chemicals, oils, automobiles and recreational products. Their research suggests that the inability of most organizations to reap the full benefit of innovations has little to do with the specific improvement tool they select. Instead, the problem has its roots in how the introduction of a new improvement program interacts with the physical, economic, social and psychological structures in which implementation takes place. In other words, it's in the implementation. It is understanding the dynamics of change, the interactions of people and processes and machines. (Repenning & Sterman, 2001).

Repenning and Sterman (2001) present their findings using causal loop diagrams; therefore, in order to understand some of the lessons learned and the method by which they were derived, a brief description of SD is appropriate at this time.

System Dynamics, the Basics

Most people's mental models are event-orientated, which leads to event-orientated problem solving. People assess the state of affairs and compare it to their goals, thus perceived gaps between the situations define a problem. Once the problem is formulated, various options are considered to correct it, then the perceived best solution is selected, action is taken, results are observed, and finally the problem is solved (Sterman, 2000).

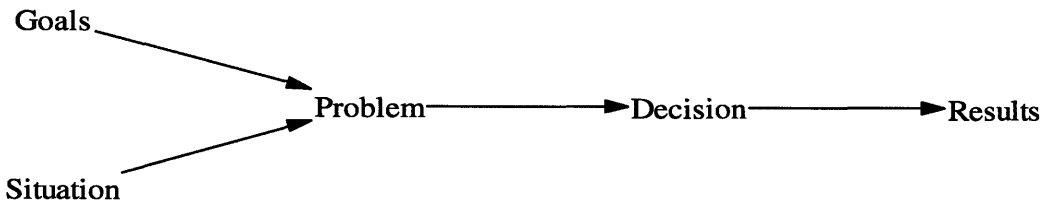

Figure 3-Event-orientated view of the world. (Sterman, 2000)

The problem is that people are embedded in the system and the actions they take redefine the situation on a continual basis, i.e. there is feedback. Feedback is often discussed as "side effects" or unintended consequences. When action is taken, there are various effects. Those effects that were thought of in advance, or were beneficial, we call the main or intended effects. Those effects that were not anticipated or somehow undercut a policy and are harmful to the system are called "side effects". In reality, side effects are just effects. They are occur because people have a narrow or flawed understanding of the system. The systems people operate are more complex than they are generally able to imagine.

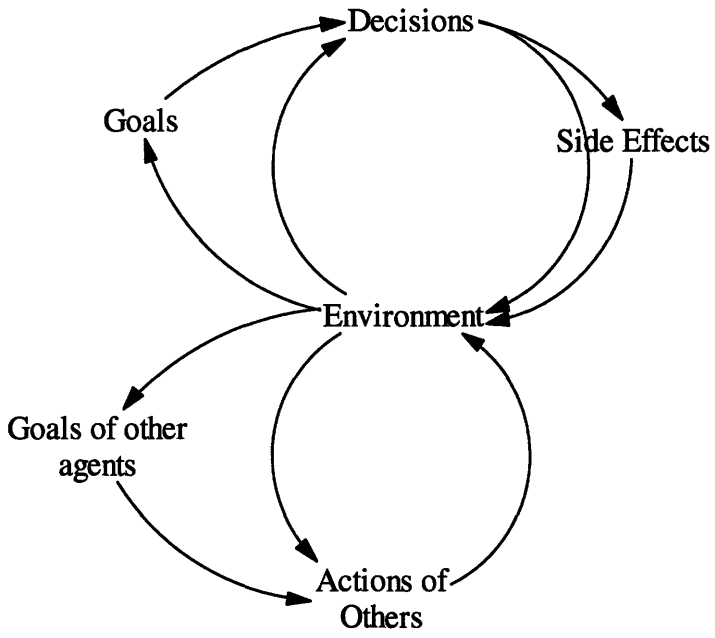

Figure 4-Feedback view of the world. (Sterman, 2000)

But what are all these loops and what can they tell us? How can they be used to understand and model systems?

In the field of SD modeling, positive and negative feedback processes are often described via a simple technique known as causal loop diagramming. Causal loop diagrams are maps of cause and effect relationships between individual system variables that, when linked, form closed loops. For example, Figure 5 presents a generic causal loop diagram. In the figure, the arrows that link each variable indicate places where a cause and effect relationship exists, while the plus or minus sign at the head of each arrow indicates the direction of causality between the variables when all the other variables (conceptually) remain constant. More specifically, the variable at the tail of each arrow causes a change in the variable at the head of each arrow, either in the same direction (in the case of a plus sign), or in the opposite direction (in the case of a minus sign) (Tutorial, 2007).

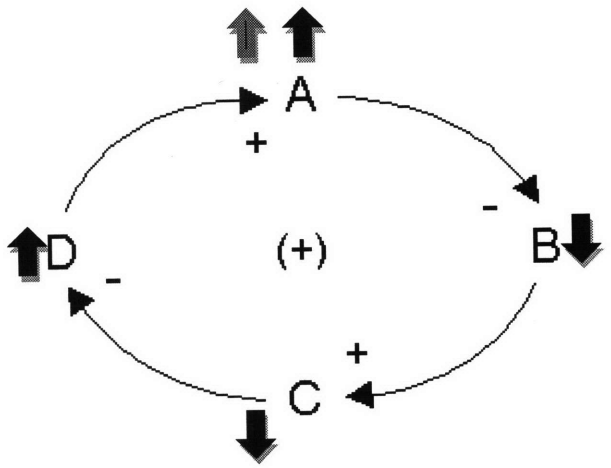

Figure 5-Reinforcing Loop.

A large plus sign here indicates a reinforcing loop denoted by an "R" in some models, which indicates a positive loop. A large minus sign, or "B", indicates a negative or balancing loop. In Figure 5, the loop is positive and defines a self-reinforcing process. This can be seen by tracing through the effect of an imaginary external shock as it propagates around the loop. For example, if a shock were to suddenly raise Variable A in the figure, Variable B would fall as denoted by the arrow (i.e., move in the opposite direction as Variable A), Variable C would fall (i.e., move in the same direction as Variable B), Variable D would rise (i.e., move in the opposite direction as Variable C), and Variable A would rise even further, note two up arrows (i.e., move in the same direction as Variable D) (Tutorial, 2007). A graph of "A", "B", or any of the variables in this loop would look a lot like either an exponential growth, or an exponential decline, depending on the shock to the system. A positive shock would set the loop to grow, while a negative shock would set the loop to decline.

By contrast, Figure 6 presents a generic causal loop diagram of a negative feedback loop structure, or the balancing loop. If an external shock were to make Variable A fall, Variable B would rise (i.e., move in the opposite direction as Variable A), Variable C would fall (i.e., move in the opposite direction as Variable B), Variable D would rise (i.e., move in the opposite direction as Variable C), and Variable A would rise (i.e., move in the same direction as Variable D). The rise in Variable A after the shock propagates around the loop acts to stabilize the system, i.e., to move it back towards its state prior to the shock. The shock is thus counteracted by the system's response.

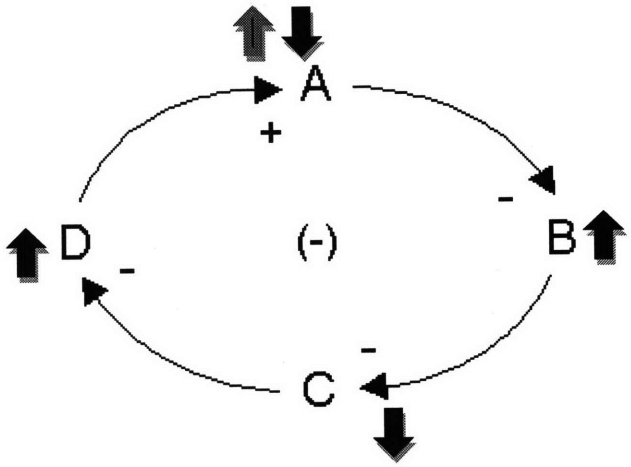

Figure 6-Balancing loop.

The output of this look looks a lot like an "S" curve, where the system receives a shock and then seeks to return to a state of equilibrium.

A simple example found in Sterman (2000) described the case of the chicken, the egg and the road. First we look at the reinforcing loop of the chicken and the egg. All else being equal, the more eggs the more chickens, the more chickens the more eggs.

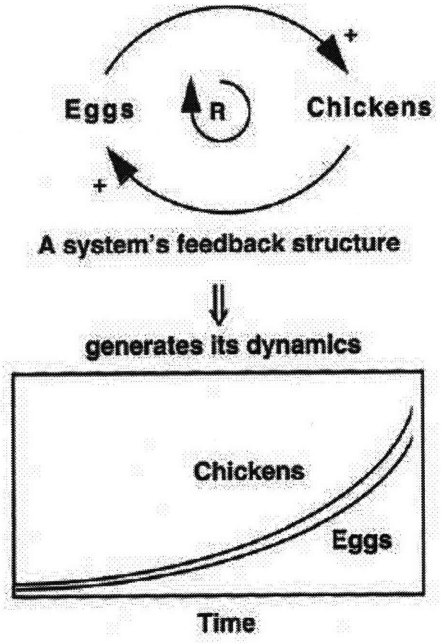

Figure 7-Reinforcing Chicken-Egg (Sterman, 2000)

We see that this grows continually when set up with a positive jolt. The next loop is a balancing loop. In a balancing loop, the more chickens the more that cross the road, the more that cross the road the fewer chickens.

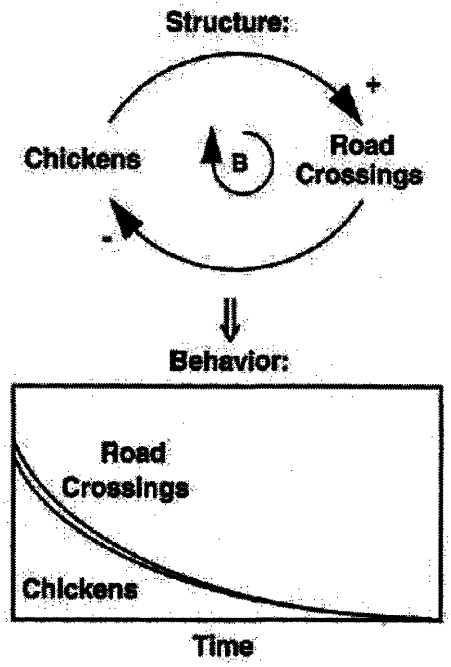

Figure 8-Balancing Chicken-Road Crossing (Sterman, 2000)

Attempting to understand this system and put these two loops together as seen in the figure below the output becomes complicated based on a number of factors. How many eggs were available at the outset, what is the rate of chickens lost due to road crossings, what is the birth rate, etc.? How much more complex are the organizations that people operate in today?

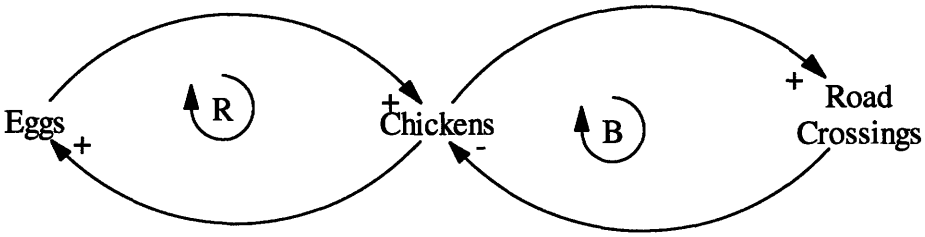

Figure 9- Chicken Egg & Road System (Sterman, 2000)

Understanding the complexities of the interaction of a system is vital to good decision making. In order to model the real world, there are other tools within SD. Jay Forrester (1961) argued that most systems can be modeled with causal loops, stocks, flows and delays. Stocks are accumulations that characterize the state of the system and generate the information upon which decisions and actions are based. Stocks give the systems inertia and provide system memory; they create delays by accumulating the difference between the inflow to a process and its outflow (Sterman, 2000). It is beyond the scope of this thesis to give a detailed explanation of how all these tools fit together to form the SD discipline, but a brief example is instructive.

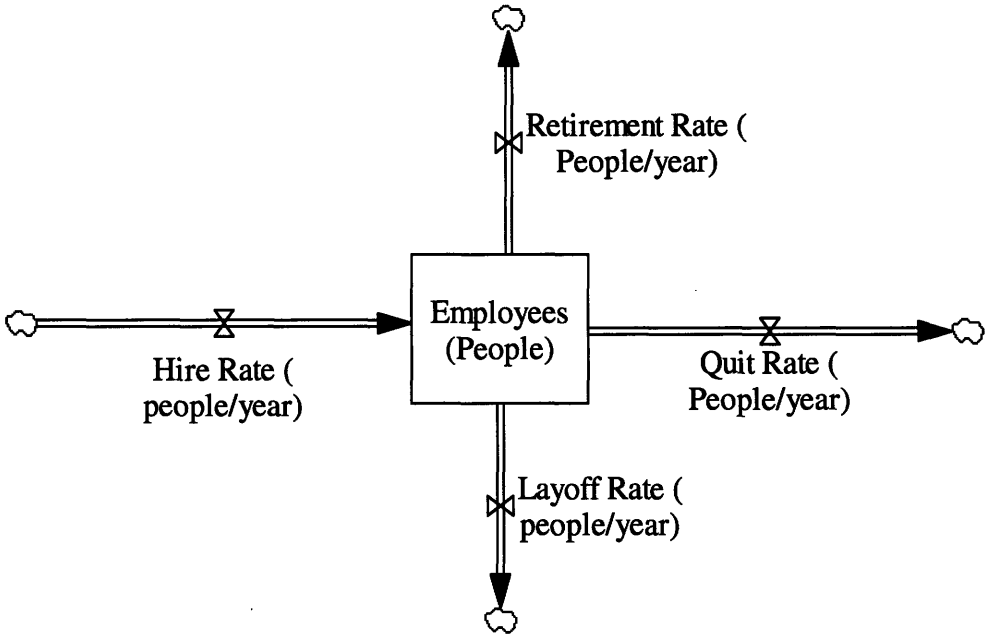

*Figure 10-*Stock and Flow

In Figure 10, employees are the stock of people, while the flows that increase the number of employees is the rate at which people are hired. Outflows from the stock are the rate at which people quit, people are laid off and people retire. This relatively simple explanation helps to put the concept of stocks and flows into an understandable form. For a more in-depth understanding, Sterman (2000) is an excellent reference.

Business Case Continued

Armed with a basic understanding of SD, an attempt to briefly explain some of the core lessons learned from the Repenning and Sterman (2001) study mentioned earlier is undertaken. Their model provides a useful framework for thinking about the challenges associated with implementing improvement programs and practical suggestions to increase their chances of success. The model was originally based on two major automakers, and as the authors studied other companies, they observed the same dynamics, generalized below.

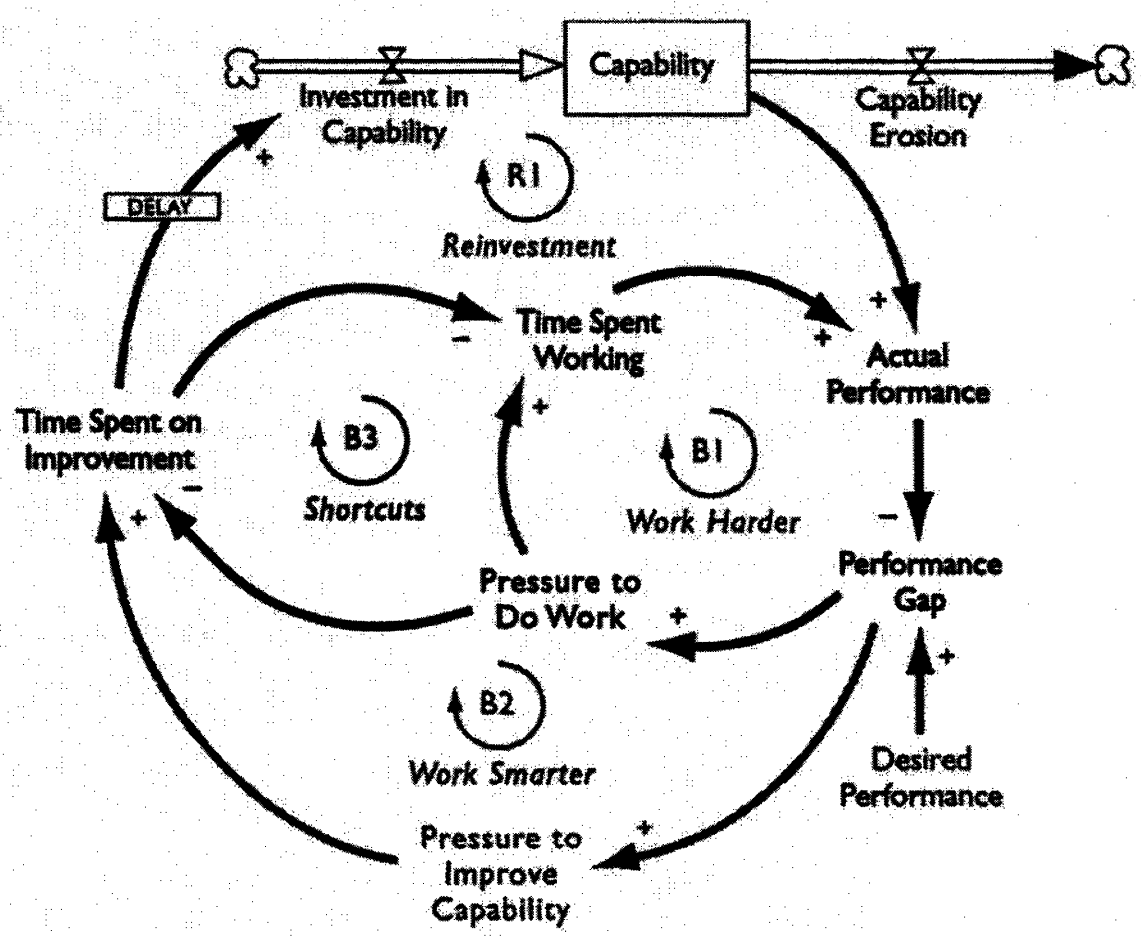

Figure 11- (Repenning & Sterman, 2001)

Notice the several balancing loops and a reinforcing loop. A brief explanation of the dynamics associated with these loops is given here as well as examples of some of the behaviors that are symptomatic of those dynamics. A summary of some of the lessons learned from the study will also be provided

First, the authors note that performance of any process can be increased by dedicating additional effort to either work or improvement. Time spent improving the capability of a process typically yields more enduring change. For example, boosting the workweek 20 percent might yield an increase output of 20 percent, but only for the duration of the overtime. Gains in process capability, however, boost the output generated by every subsequent hour of effort which is a considerably longer period of time (Repenning & Sterman, 2001). This choice is denoted in the model by the two arrows leading from the performance gap to either pressure to do work (more effort) or pressure to improve capability.

Improving the capability seems a logical choice because it yields more permanent gains, but there are several problems with this assumption. First, time spent on improvement does not immediately improve performance. Second, there is no assurance that the improvement will actually be effective so there is some risk involved. Third, no improvement in capability lasts forever; people rotate out, machines wear out and processes get outdated and finally time spent on improvement takes time away from work (Repenning & Sterman, 2001). The fact that benefits are often not immediately reaped from a process improvement is noted by the delay in the time spent on the improvement variable. This delay is important because most people are event-orientated thinkers as mentioned earlier. They often miss the results of their actions because they have moved on. Studies have shown that highly complex improvement efforts can take several years before benefits are realized. The fact that capabilities erode over time is denoted by the flow leading out of the capability stock. For organizations with high turnover or rotations, the erosion of capability is faster.

The performance gap is the difference between actual performance and desired performance. Managers are constantly searching for ways to improve performance by trying to increase the amount of time people spend working or by launching an improvement program. As mentioned earlier, one of the risks of an improvement program is that it may not be successful; this, combined with the delayed reward, leads most managers to prefer the work harder option .

The study showed that, in many organizations, working harder was not merely a means to deal with isolated incidents, but instead, became standard operating procedure as workers and leaders all come to rely on constantly working harder to meet goals (Repenning & Sterman, 2001).

Referring back to the model, the reinvestment loop is a positive feedback that tends to reinforce whichever behavior currently dominates. An organization that successfully improves

its process capability will experience increasing performance. As the performance gap falls, they have more time to devote to improvements, creating a positive reinforcing and virtuous cycle. Conversely, if managers respond to the gap by increasing work pressure, employees increase the amount of time spent working and cut their time spent on improvement. Capability begins to decay as people get tired, burnt out, move on, etc. This increases the performance gap, and forces people to work even harder to meet goals (Repenning & Sterman, 2001).

The Shortcut Loop, B3, captures the idea that increased throughput comes at the cost of departing from standard routines and processes, cutting corners and reducing the time spent on learning to do it right. When faced with deadlines and increasing pressure, people will generally skip steps to get the job done. Shortcuts are appealing because the negative results of shortcuts are usually delayed in time (Repenning & Sterman, 2001). In one example offered in the study, supervisors who defer preventive maintenance often experience a "grace period" in which they reap the benefits of increased output. For example delayed maintenance gives the immediate advantage of using the equipment, but the long term side effect may be higher failure rates at a much later time.

This shortcut loop can often be recognized by viewing the awards of an organization. What does the organization reward or value? Do they promote those who, through heroic efforts, manage to save troubled projects, often by circumventing processes? The study showed that most organizations reward last minute problem solving over learning, training and improvement activities that prevent such crises in the first place. Over time, senior management will increasingly consist of "war heroes" who are likely to groom and favor other "can-do" people. (Repenning & Sterman, 2001). Incentives, culture and stories of these heroes not only reinforce the tendency toward short-term thinking and working harder, but are themselves shaped by that very short-term focus and work-harder mentality, creating a reinforcing feedback that intensifies the capability trap and makes implementing improvement changes more difficult (Repenning & Sterman, 2001).

A great example of a company that overcame this paradigm is DuPont. In 1991, an in-house benchmarking study documented a gap between DuPont's maintenance record and those of the best performing companies. DuPont spent 10-30% more on maintenance per dollar of plant value while plant uptime was 10-15% lower (Repenning & Sterman, 2001).

Winston Ledet, along with a team charged with improving maintenance operations, developed a SD model of the issues. Analysis showed that escaping the capability trap meant performance would deteriorate before it could improve. They knew that, in order to get the reinvestment loop to work in the virtuous direction, they needed to invest in maintenance and training, and all the while, uptime would go down (Repenning & Sterman, 2001). The problem was implementation,

"The team converted the model into an interactive role playing game called the Manufacturing Game. They embedded the game in an interactive workshop designed to create an environment for learning. Despite many simplifications, playing the game evoked real emotions and allowed people to simulate in a few hours what might normally take years to see. It also allowed people to play other roles, thereby expanding their understanding of the whole system. ". (Repenning & Sterman, 2001). Plants that implemented the program by the end of 1993 had dropped maintenance costs by 20%, improved customer service by 90% and cut delivery lead time by 50%, all with minimal capital investment. In plants that did not implement the program, costs were up by an average of 7% (Repenning & Sterman, 2001).

The lessons learned from a SD approach seem to be generalizeable to other companies; the question remains, can similar lessons be learned from analyzing the Coast Guard. Given the tremendous success of those that took the time to understand all the effects and dynamics of an improvement program, it seems like a worthy investment. This understanding is critical for a successful implementation. Lean enterprise analysis helps figure out where an enterprise is with respect to the optimal use of its resources. It also describes where they should be as a future state.

CHAPTER 4

Lean Analysis

The Logistics Organizational Alignment Team (LOAT) was chartered to develop the field-level architecture for the mission support organization in the First District's area of operations. The LOAT worked closely with the Field Level Integrated Planning Team (FLIPT) created by Coast Guard Headquarters (CG-4), engineering and logistics. The goal of this team was to develop an infrastructure to provide integrated support to operational units across the entire Coast Guard. I, along with several classmates, took on the challenge of assisting the LOAT in analyzing the data collected and developing recommendations for a field level architecture for mission support. The new architecture should integrate smoothly (creating flow) up the chain to the Coast Guard Headquarters Mission Support Command, which was being developed by the FLIPT, while staying flexible and responsive to field level operational customers. The Integrated Support Commander (ISC) Commanding Officer, Captain Scott Keene, was the leader of the LOAT and served as our champion and sponsor. The LOAT's charter was signed by Rear admiral (RADM) Sullivan, the Commander for operational forces in the District One area, and RADM Hewitt, the Maintenance Logistics Commander (MLC) Atlantic.

The Coast Guard Integrated Support Command (CG-ISC) is a service provider. It provides the logistics and services for operators within the CG. The figure below shows the way in which the Coast Guard has divided up the nation into geographic regions. The work presented here was performed in the District One region and/or enterprise, which extends from Maine to New Jersey.

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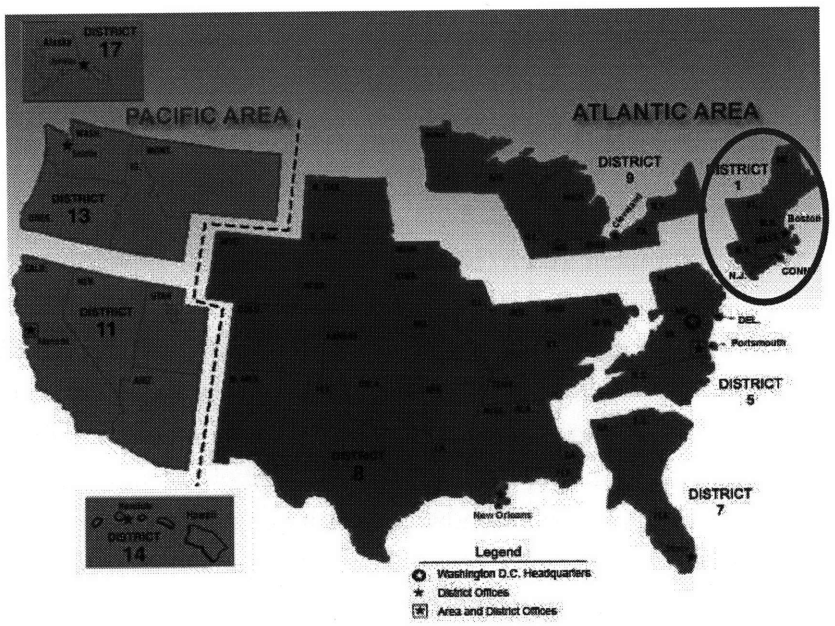

Focus on District 1 (Northeastern US)

Figure 12-Coast Guard district map.

Within this area of responsibility, we specifically focused on the logistics command. Organizationally, the CG is divided into two components: the operations side and the logistics side. While supplying support services to their customers (operational units), the ISC has a logistics chain of command from which they obtain guidance and support services. These links, shown in the figure below, shall also be evaluated.

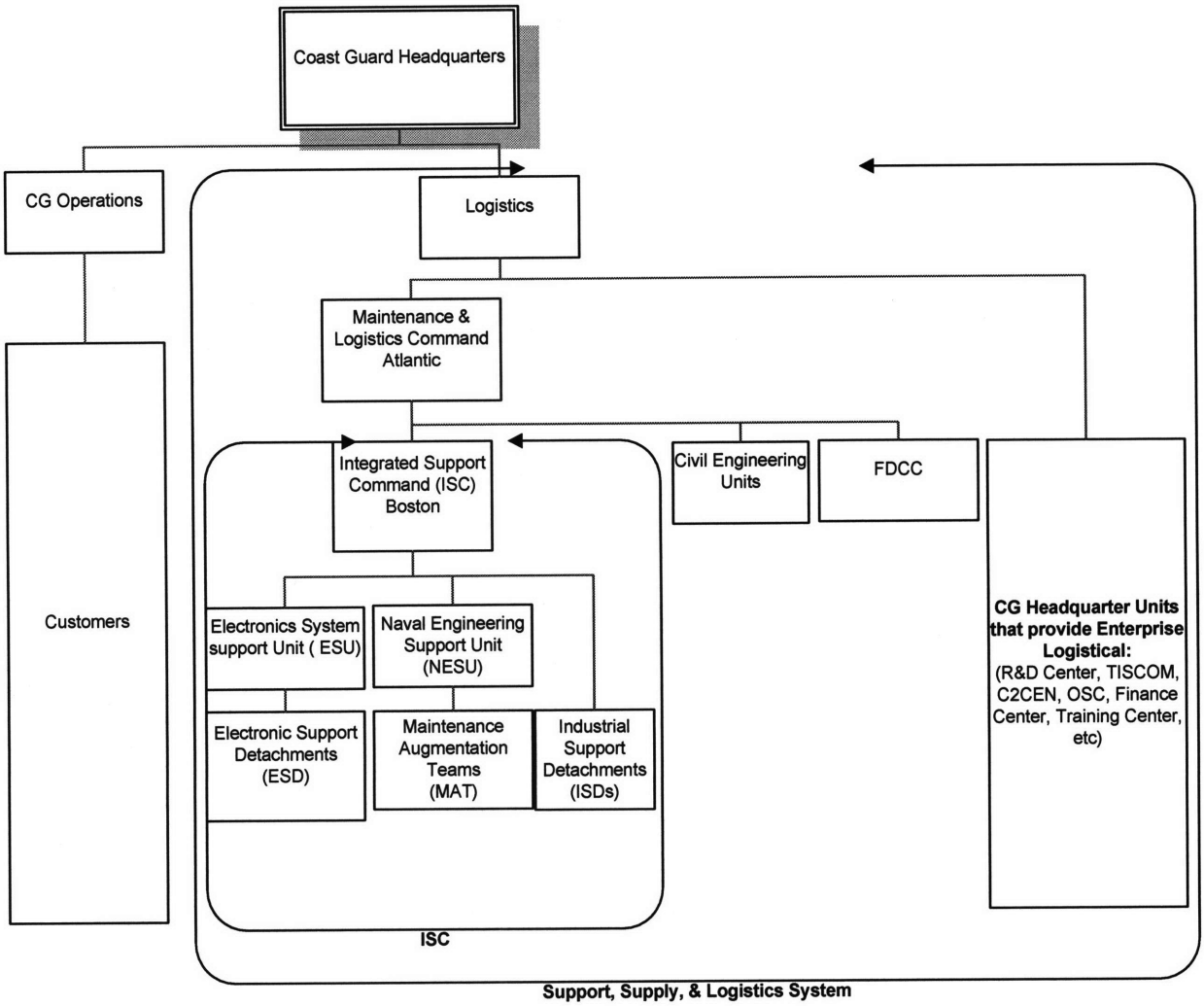

Figure 13-ISC within CG organization.

The logistics command, known as the Integrated Support Command (ISC), provides support services to all of the operational and Headquarters' units within the geographic area of the First Coast Guard District. The ISC provides the services outlined in Table 2 to the customer. The electronics support is provided through the Electronics Support Unit and their subordinate units, the Electronic Support Detachments (ESDs), which are smaller and located geographically close to the customer. Naval support services are provided by the Naval Engineering Support Unit (NESU) and its subordinate units, Maintenance Augmentation Teams (MATs), which are also located closer to the customers. The Industrial Support Detachments (ISDs) provide cross-functional support via specialists such as welders, carpenters, plumbers and other experts for whatever is needed. All of these units work for the Coast Guard Integrated Support Command (ISC), which also provides assistance with personnel issues, including medical, housing, pay,

and morale. The actual number of logistic support functions evaluated in the study was over 105, and the general categories of support provided are depicted below:

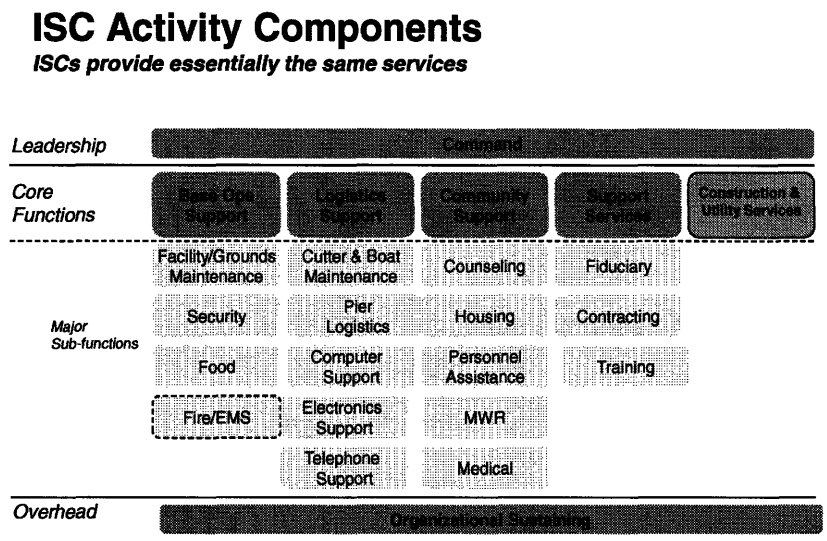

Table 2-ISC Services

Following the EVSMA framework, we performed a current state analysis of ISC stakeholders, processes, and metrics alignment. In addition, a LESAT was administered. Consolidating and summarizing all the information collected, we proceeded to identify Coast Guard enterprise-level wastes in the current state.

Working with the ISC and based on the strategic objectives of the organization, the LOAT defined a desired new state. Rather than be distracted by which box should go where, which always creates angst, focus was concentrated on the bridge or transition plan from the current state. A SD analysis of the organization with respect to change was completed as well. As mentioned, implementation of transformations is not as simple, as a linear process. Armed with the current-state areas of improvement and a SD model of change implementation, some policy recommendations were made, with the aim of minimizing migration impact on current customer services while effectively reaching the strategic goals. In the end, the future is not clear, and the organizational vision is flexible enough to change effectively and efficiently when the context requires it. This has been the focus of this thesis.

Secretary of State Dean Acheson said in 1959:

> Organization or reorganization in government can often be a trap for the unwary. The relationships involved in the division of labor and responsibility are far more subtle and complex than little boxes which graph drawers put on their paper with perpendicular and horizontal connecting lines (Logisitcs Organizational Alignment Team, 2007).

Dr. Geary Rummier said, "Put a good person in a bad system, and the system wins every time" (Logisitcs Organizational Alignment Team, 2007).

It behooves the prudent leader to think long and hard before making a major change within an organization. This analysis was thought to be well worth the investment if it could provide any insight into practical actions that could improve the likelihood that an implementation plan will be successful.

In this section of the thesis, an enterprise definition and the project background information is provided in relation to Coast Guard ISC organization. Data collection in the project will be discussed and the current state of the data will be presented. Wastes are identified within the organization and a list of the improvement opportunities is presented. Recommendations were made to the Coast Guard through the LOAT, but after researching and finding the low probability of success for any implementation, it was decided to take a different approach in this thesis. The SD analysis made clear that successful implementation of any improvement program needed more than current state, future state and bridge. Lean analysis was an excellent tool for finding current state waste areas; this chapter focuses on what they are and how we found them. The bridge will be discussed in later chapters.

The Coast Guard is a 24 hour per day, 7 days per week operation with a high operational tempo. This results in minimal time for maintenance and repair of assets, and a staff that works long hours. Therefore, the goal of the ISC is to provide seamless, on-time, easy logistical support to the operational staff. The ultimate goal of the ISC is to serve all support needs of the Coast Guard's operational staff, its primary stakeholder.

Logistics and support for the Coast Guard comes with many challenges. The organization is a constant operation, leaving little down-time for logistics, maintenance, and repairs. It also has a tight monetary budget with continual Congressional oversight. The Coast Guard has undergone changes with the move to the Department of Homeland Security, and there have been a number of recent challenging events, such as Hurricane Katrina, failures in the Deepwater modernization program, and the terrorist attacks of September 11, 2001, (which led to major

changes in mission priorities). The ISC must overcome these challenges and provide logistics and support to keep the Coast Guard operationally efficient in a changing world. They are currently meeting the growing demand for services through the "working harder" philosophy, which cannot last forever. Since there is no foreseeable increase in personnel, the ultimate goal of this study is to find ways to work smarter and reduce redundancy and waste (*muda*) wherever possible in order to increase the capacity and quality of service.

The five principles for Lean Enterprise derived from Lean Manufacturing and research from the Lean Aerospace Initiative as outlined in the Lean Enterprise Value (Murman, 2002) are:

1. Create lean value by doing the job right and by doing the right job.
2. Deliver value only after identifying stakeholder values and constructing robust value propositions.
3. Fully realize lean value only by adopting an enterprise perspective.
4. Address the interdependencies across enterprise levels to increase lean value.
5. People, not just processes, effectuate lean value.

Doing the right job correctly is much harder than the first principle would seem to indicate. Many organizations, when they think of lean, focus strictly on doing the job right, refining their processes and perfecting their procedures. Knowing the right thing to do can also be very challenging. The second principle indicates it is impossible to know what the right thing to do is unless you have analyzed all the stakeholders, their roles, their values and their priorities. Many companies focus only on the customer, or the share holder. One of the faults with the data collected from the surveys of this study was that it focused mainly on the operators as the customer, but there are many other stakeholders that have an effect on the mission. The third principle deals with understanding the many interdependencies in an enterprise and realizing that global optimization is better than local optimization. The fourth principle is in line with the SD philosophy, in that the connections between and across the organization have a powerful effect and need to be addressed. The last principle is the realization that nothing happens without people; understanding and valuing them in actions as well as words is required if a lean enterprise is going to work. This is particularly true in the Coast Guard, as their main value is public service as opposed to a product.

The LOAT designed the survey instrument to include five questions to be asked of each logistics service function. These were developed in accordance with the objectives of the charter.

The wording and structural design of the questions were the result of consulting with the Coast Guard Leadership Development Center in Groton, CT. The list of questions were also divided into three groups: command and personnel (56 questions), engineering (35 questions) and supply (14 questions). In addition to the survey questions, they also conducted focus groups. The focus group questions, along with the survey questions, are both shown below

Survey Questions
Who provides this service to you or your unit?
How effective is the procedure that you are using? (rate 1-10)
What factors need to be improved to make this logistics service more effective (check all that apply)? Note: Answer based on current provider of the service. • Knowledge, skills, abilities • Reliability • Consistency • Cost Effectiveness • Responsiveness • Timeliness • Accountability • Adequacy of provider's resources (people, funding) • Awareness of customer needs • Specify your own value (write in)
Rate your ability to improve this procedure using your chain of command. (rate 1-10)
Would you prefer to get this service elsewhere? (yes or no)

Table 3- LOAT Survey Questions

Focus Group Questions
Presently, what are the main barriers to performance in terms of logistics support?
What are the best 3 performing logistics services? (vote and comment)
What are the worst 3 performing logistics services? (vote and comment)
How do you communicate your logistics needs to your suppliers?
Are your suppliers accountable for meeting your needs? Explain.
Please share your views on the following statement: I want logistics support services working for me locally, accountable through a common chain of command.
Please share your views on the following statement: I just want logistics support delivered with as little engagement on my part as is necessary, so I can focus on operations.
What is your view on finding and using "work-arounds" to meet mission needs? Explain.
Who would you say is more likely to be rewarded with professional endorsements and favorable evaluations? Who will be held accountable? Explain your answer. A. A local hero who always seems to make mission deadlines by demonstrating extra-organizational resourcefulness OR, B. A leader, capable of "saying no," who pulls an asset from ready status to utilize the established system processes to effect repairs.
What motivates field personnel to take initiative to ensure mission readiness?
What's your comfort level with centralized logistics services?
Would you agree with the statement "push logistics would make my life easier"? Explain.
What does Logistics Transformation mean to you?
If you could improve mission support how would you do it?
What future challenges should we be looking at?
What do you see as being the greatest barriers to changing the logistics service organization?

Table 4-LOAT Focus Group Questions

To capture and organize the largest amount of data in a short period of time, and to ensure the highest response rate of our intended population sample, the LOAT contracted a company to use their "Think-Tank" software, laptops and technical support. They held 13 sessions, two each at Air Station Cape Cod, Sector New York, Sector Southeastern New England, Sector Northern New England, Sector Boston and one session at the Coast Guard Academy. Each session lasted three hours and included a presentation, orientation to the surveys and focus groups, time for individual completion and time for group "anonymous chat room style" focus groups. Participants appreciated having dedicated time to provide input verses finding the time during the work day (Logisitcs Organizational Alignment Team, 2007).

Data was collected from 211 Surveys and 13 focus group sessions. The figure below shows the units in which the participants were assigned. Aside from being operator focused, the respondents who were predominately enlisted had several years of experience. The 211

respondents had a combined total of 3046 years of Coast Guard experience, averaging about 14.4 years per respondent.

Unit Type	Number of Respondents
Station	51
Aids to Navigation Team	10
Small Cutter[1]	26
Large Cutter[2]	10
MSST and PSU (DOG units)	6
Sector and Sector Field Office	42
Air Station	24
Coast Guard Academy	17
Other	25

[1] Small cutter includes WLM, WPB 110, WPB 87, WTGB 140, and WYTL 65.
[2] Large cutter includes WMEC and WLB.

Table 5-LOAT Unit Types Surveyed

Current Performance

From the surveys, personal experience and interviews, we found that the ISC currently has a number of strengths and weaknesses that can help guide the transformation. They are as follows:

Strengths:

- Responsible and flexible in emergency situations
- Substantial expertise in specialty areas
- Creative and efficient workers
- Dedicated workforce
- Direct, personal engagement with the customer

Weaknesses:

- In non-emergency situations, there are too many layers of bureaucracy and the process is too complicated to enact efficiently
- Lack of configuration management and control
- Lack of property management and control
- Multiple forms of accounting (multiple people have to account for the same things in multiple ways)

- Lack of consistent measures of effectiveness
- Lack of standard processes
- Many (and sometimes inconsistent) levels of engagement

In summary, the ISC has an engaged and creative workforce, the cornerstone of the Toyota Production System. However, it lacks the standardized work, level and balanced production, and centralized organization that can make an organization more effective.

Objectives

As a result of looking at the operating environment, goals, and current organization, a number of objectives and goals were identified.

- Be responsive in both emergency and non-emergency situations
- Streamline accountability
- Streamline information technology (IT) tools to reduce redundant data entry
- Standardize simple processes to have consistency across the organization
- Remove incontinences and unnecessary work for the operators in obtaining support services
- Change the organizational structure to support a policy of configuration management, accountability, and life cycle support.
- Align rewards and evaluations systems to support strategic goals

Strategic Goals

We identified a number of strategic goals to help provide the best possible support to the CG operational units. First, the ISC would like to align its transformations with those of CG Headquarters. Specifically, the headquarters is focusing on performance management and improvements such as logistics transformation, capability-based planning models, and the determination of manpower requirements. The ISC would like to increase flexibility and responsiveness by optimizing the workforce, and provide seamless service that allows operators to focus on their operations.

In addition to the strategic goals relating to the customer, ISC would also like to (vertically) integrate seamlessly up its own command chain. Currently, many of its processes are controlled by other units within the Coast Guard structure. In addition, the ISC would also like to track and measure the items that it is responsible for accounting for (property, training, money, and measures of effectiveness).

Another goal is to have a more centralized logistics system. A centralized logistics organization has proven to have great success for the Coast Guard's aircraft and aviation-related

operations. The aviation program is centrally managed with corporate stewardship, embedded logistics, and clear program visibility. The ISC of the CG currently has distributed management with individual ownership and lacks visibility. Although there are many different types of support for many different operational units within the ISC, there are many similarities that could be exploited across the different types of support to enable a more efficient organization. Therefore, a major strategic goal is to transform ISC logistics into a leaner operation that may resemble the current CG aviation model.

Stakeholders

The Coast Guard ISC has a number of key stakeholders which are categorized and described below.

Customers and End Users:

- Operational units within the CG, which include: districts, stations, cutters, and air stations. In essence, all Coast Guard personnel within the designated geographical area of the district. These are the people within the CG focused on the mission that rely on the logistics and support from ISC to perform their duties.

- The people of the United States are the true end customers. They are serviced by the operator, who relies on the logistics system in order to complete the mission. In addition, as taxpayers, they influence the government representatives on issues that affect the CG.

Suppliers

- Commercial suppliers are the aggregated group of all commercial providers of both hardware and software. This group ranges from the local Home Depot to a commercial shipyard.
- Coast Guard suppliers are the aggregated list of all other units within the CG that provide government furnished equipment (GFE) or services to the ISC.

Partners

- Other Coast Guard entities with shared responsibilities; for example, the computer system is the responsibility of the ESU (Electronic Systems Unit), a subordinate of the ISC, but the Wide Area Network is the responsibility of a peer CG organization known as TISCOM. TISCOM partners with the ISC to provide a system service to the operators. This type of partner and/or shared responsibility is pervasive throughout the enterprise.

Employees

- ISC Boston includes personnel, training, work-life, housing, facilities, strategic planning, accounting, procurement and operational readiness.
- The Electronic Systems Unit (ESU) provides all of the electronics support in District 1; it is made up primarily of technicians with expertise in electronics, computers and telephone systems who provide maintenance and casualty response to all command, control and communication systems within the region.
- The Naval Engineering Systems Unit (NESU) is made up of naval engineers and technicians that provide life cycle maintenance support and casualty correction for small boats, cutters and larger ships.
- Industrial is made up of skilled craftsmen and specialists such as welders, pipe fitters, etc. They distribute their skills in the service of the ESU, NESU, the ISC, or wherever those particular skills are needed.
- Medical staff includes medical doctors, dentists, their assistants, and staffs. They provide medical/dental primary care and referrals throughout the region to GC employees.

Leadership

- The first layer above the ISC is the Maintenance and Logistics Command (MLC) Atlantic, which provides the leadership/chain of command for ISC Boston. They are ultimately responsible for the work provided from ISC to the operational units.
- The second level up is Atlantic Areas, and then Coast Guard Headquarters, which provides policy direction, strategic prioritizations and explicit tasking on national initiatives.
- For the next level we can aggregate the Department of Homeland Security (DHS) and the Presidential Administration, represented most often by the Office of Management and Budget (OMB) and Congress as oversight, audit and ultimate source of funding.

Shareholders and Society

- Ultimately, the CG and the ISC are funded by the government through taxes; therefore, all tax-paying US citizens could be considered shareholders.
- The operating budgets of the CG and ISC are allocated through the US Congress.

Figure 15 below shows an interconnection of stakeholder dependencies. The stakeholder network diagram gives a high-level overview of the interactions between the ISC and its stakeholders. The action of service provision is indicated in blue, and the action of giving commands is indicated in red. The primary funder and customer are indicated in blue and yellow, respectively.

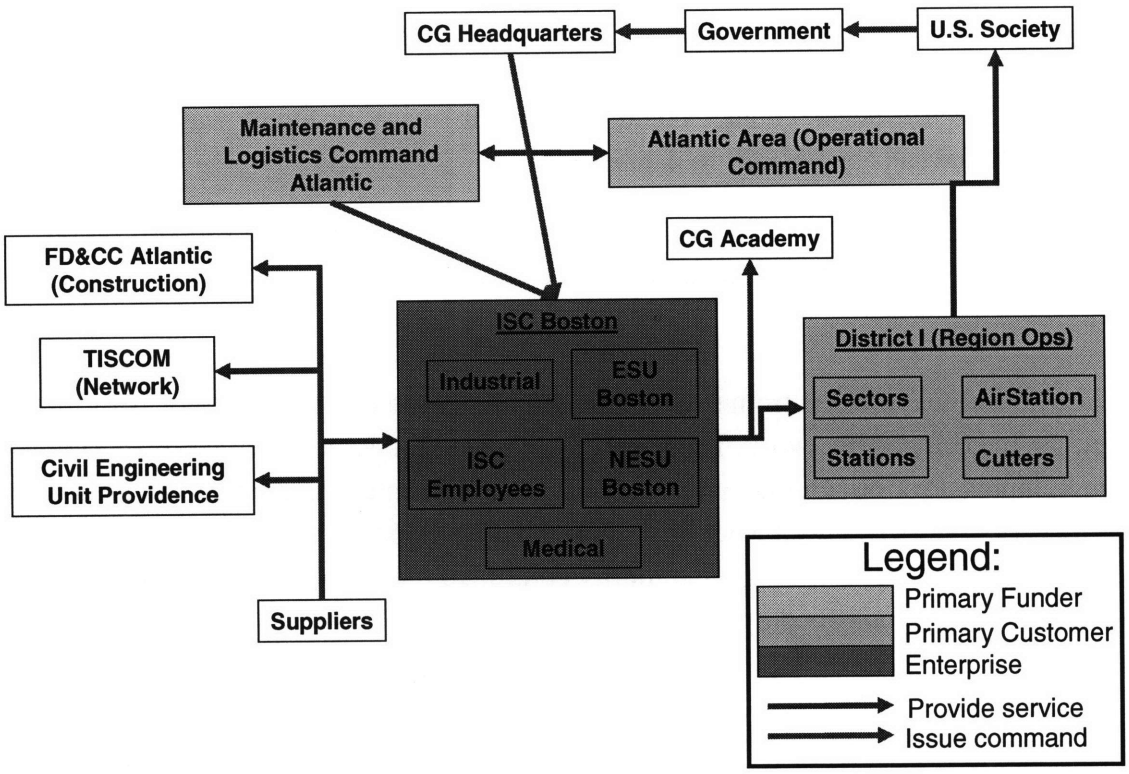

Figure 14 Stake Holder Relations

Each of these stakeholders has their own needs, as well as some power. Priorities are generally based on the combination of these two items. The goal would be to have priorities based on enterprise optimization instead of each stakeholder optimization. For instance, the operator may need some new radio, but MLC's priority is to have only standard radios. Who wins and who loses in this case?

Processes

The current ISC process stream is rather convoluted, partly as a result of its heritage. Originally, all logistics processes within the CG were "stove-piped"; each type of support or logistics service had its own process, and these processes were kept completely separate. This resulted in an organization in which all functions operated independently with little to no overlap between them. Each of these stove-pipes had its own services, processes, and database/information systems.

As the CG grew, it became apparent that a centralized logistics organization would be beneficial; therefore, the many different logistics services were combined into the ISC in both name and organizational structure. However, their processes were not centralized. Each of the different types of processes now exist in a single organization, which results in the customer having many different ways to request a service (both different requesting processes and different people and/or offices). The decentralized nature of the ISC's processes results in

extremely complex interconnectivity of services provided within the ISC. The customer must contact a different unit for each type of support and there are often multiple people that could be contacted, and each type of contact could be done in many different ways, with processes ranging from phone calls and emails to databases.

Ideally, many of these duplicate process and avenues for obtaining support can be eliminated, vastly simplifying the processes for the customers and employees.

Enterprise Process

An EVSM was created from some of the major, non-emergency ISC processes that represent the majority of ISC work. These processes were first described in terms of SIPOCS (Suppliers, Inputs, Process, Output, and Customer) charts, then aggregated into a visual value stream map. The EVSM showed what little control the operator or the ISC had in the process. For each process, policies from higher authority controlled many procedures, and the tools, utilities, or both were controlled by partner organizations, both within and without the Coast Guard.

It is commonly accepted that those that perform a task are in the best position to improve that task, but in the current paradigm, those who perform the task have multiple people and organizations they must work through to create change. We analyzed and sorted 1752 participant's statements from the 13 focus group sessions. Ninety seven percent of the open-ended logistics questions fit into ten major themes. These ten themes of the focus group are displayed below in order of the frequency of their occurrence.

Major Themes and their Frequency from Focus Groups

Major Theme	Frequency	Order of Frequency
Process Problems	196	1
Problems with Customer Awareness and/or Feedback Loops	193	2
Problems with Accountability	150	3
Resource Problems	145	4
Staffing Standards Problems	109	5
Problems with Knowledge, Skills, Abilities	97	6
Timeliness and Responsiveness Problems	80	7
Concerns with Over Burdened Operator	73	8
Information Systems Problems	62	9
Configuration Control and Standardization Problems	60	10
Misc Comments	48	11

Table 6-Major Themes from Focus Group

Process problems: Respondent's statements about "process problems" emerged most frequently. Statements were grouped in this category when they described inefficient, failing, overly burdensome, or outdated logistics processes. Examples of quotes from the survey:

"Too many layers if approval and validation for simple logistics support."

"This is a key component of what makes the Coast Guard the flexible organization that it is. The key is that the work-a-rounds [short-cuts] should be due to exigent circumstances not a failure of the supply chain during normal everyday ops."

"Old tech pubs, part numbers outdated systems."

Problems with customer awareness and/or feedback: Respondents assert that ideas, process improvements, etc., implemented at the local level, do not easily inform improvements or change within the logistics infrastructure. Operational units do not feel they have the ability to make changes or provide feedback about how logistics services are being delivered, even though they hold the valuable information about better processes, measurable problems, inefficiencies and qualitative input that can help logistics providers. This information has no clear avenue to

get back to the logistics provider. This lack of feedback leads to mismatched expectations and wasted effort on both sides. Examples of quotes from the survey:

> "Work-a-rounds do work and can be effective; however, they are also a sign of a problem, why not encourage feedback as to why they were/are used- improve the process to understand work-a-rounds."
>
> "Work-a-rounds are often just innovations that improve processes and are continued until policy catches up."
>
> "Many times units are not fully aware of what kind of support they can get from each entity within the Coast Guard. A better all encompassing online program needs to be developed to cover ESD/ESU/ISC/MLC/ELC services and parts available at a glance."

Problems with accountability: 71% of respondents answered "no" to the question: "Are your suppliers accountable for meeting your needs?" They perceived that all the pressure for the Coast Guard getting the job done falls squarely on the operator and not the logistics provider. This may show a lack of alignment with metrics. Examples of quotes from the survey:

> "Support personnel need to feel the pain of not being able to operate because of poor service. Stronger leadership in support areas is needed."
>
> "Ultimately it is the unit's responsibility in the current system to follow things through to the end. Often we have to order, re-order, follow-up and even harass to get what we need to stay operational."
>
> "If supply or admin makes a mistake it does not affect them..."

Resource problems and staffing standards: Resource statements describe inadequate funding, assets, or people necessary to get the job done. This was clearly a common concern. Resource problems were identified as the largest barriers to performance for both the best and worst support functions. Examples of quotes from the survey:

> "Add more support billets instead of piling on new sets of requirements on an already strained system."

"Until the Coast Guard realizes we need more people and money to maintain this optempo, we will always have logistics problems."

"Staff up the logistics side. The Coast Guard has a problem, a lot of operators and not enough supporters."

"We do not have a dedicated YN or SK assigned. This results in becoming another collateral duty for our operational personnel."

Problems with Knowledge, Skills, and Abilities (KSA): As mentioned earlier, a lot of logistics are being performed by the operators, but they may not have the expertise or training necessary. Operators have become so weighted down with requirements, both operational and logistical, that they do not have the time to be experts at anything. They are clearly aware that logistics commands and/or units have personnel more qualified, but the statistic is clear that over 60% of their support is coming from operational units. New systems are being deployed with little training or personnel, requiring smaller units to learn on the go, which creates an interesting dynamic. Examples of quotes from the survey:

"Better PQS [personal qualification system], more schools, need to let people especially junior people develop in their primary duty before tasking them with collaterals so that they will be able to function at a experienced level in the division."

"Too much expected to OJT (on the job training), should have attended designed courses."

"Have members show up with all required training, skills, technical items needed to perform the job billet description."

Timeliness and responsiveness problems: Participants cited a lack of responsiveness to requests for support and/or timeliness of subsequent delivery as a driver for adopting local non-standard practices, even contrary to mandated policy in some instances. In order to meet the demands of urgent mission needs, operators can't wait for inefficient processes to work. Examples of quotes from the survey:

"In the aviation model, spare equipment is the norm. A station will have difficulty having downtime on assets while awaiting parts. Operators will need to be more tolerant of sitting at the pier waiting for [whomever] to provide. Thus, many units are proceeding with squirrel-nesting parts and work-a-rounds to keep operational chain happy."

"Having to resend audit information multiple times, lack of responsiveness when trying to get assistance, lack of knowledge on how the field units operate."

"I want logistics working for me 24/7, when I need something it should be readily available."

Concerns with over burdened operator: Operators felt overburdened with performing logistics functions. The simultaneous pain of an increasing range of "self-service" logistics systems and programs piled on, combined with a growing and time consuming range of information reporting systems, has left operators spending an unsustainable percentage of their time distracted from their primary duties of mission readiness and execution. Examples of quotes from the survey:

"Inadequate training on new programs (CG Central, Direct Access, TPAX, FPD, MISLE, and etc)."

"FPD, Federal Procurement Desktop; no training for boatswain mate filling and executive petty officer billet that handles this system and takes up most of his time instead of focusing on the real job (jobs that matter)."

"Pushing grunt work down to the operator. I should not be a subject expert in personnel of logistics or computer languages to achieve my end result."

Information System (IS) Problems: Problems related to information systems were reported in the focus groups across a broad range of other aspects. So many of the Coast Guard logistic services are managed, measured and delivered through IS that it touched almost every other category. Suffice to say that most operators felt overwhelmed and under-trained for what was required, and felt it took away from their primary duties. If statements were specifically IS problems, they were placed in this category. Examples of quotes from the survey:

"Not enough interconnectivity between databases."

"Logistics at this point seems to be in a crisis situation and the pressure is on the units to fix it while programs like CMPLUS are in limbo as to the next generation..."

"It's funny that when the computers are down, liberty's granted."

Configuration control and standardization problems: Deviations from adherence to the strict configuration control of assets and property, or use of mandated standardized systems, were more common than expected. Very few participants admitted to deviating, but when the issue of work-a-rounds came up, they were eager to speak on the issue. Very few said they did not practice or tolerate the use of work-a-rounds to keep from holding up mission accomplishment. The vast majority affirmed that they used or allowed process or configuration deviations to some extent in meeting their mission requirements. Two camps of philosophy fell out of the data. The first and larger group unapologetically endorsed finding and exploiting work-a-rounds to meet their often critical logistical needs. The other, smaller camp acknowledged that using work-a-rounds or side-stepping strict configuration control or practices would get them what they needed to meet mission readiness in the immediate term, but that repeated deviations came at a long-term cost at the expense of personnel and the longevity of their assets. They lamented the constant churn of the inefficient logistic systems which drive the Coast Guard's attitude towards work-a-rounds in the field, and the attending culture which rewards "local heroes" whose resourcefulness to succeed in spite of the system actually aggravates and protracts its chronic dysfunction. Examples of quotes from the survey:

> "Work-a-rounds occur when the bureaucracy can't get the job done for you. This breeds inefficiency, non-standardization and anarchy. I hate it."
>
> "If every Coastie, used the system vice work-a-rounds the CG would be one of the worst government agencies, not one of the best. Unfortunately, that type of culture is not something to be proud of, but we are."
>
> "There is a limit to what and how many work-a-rounds should be tolerated or acceptable, but given our service optempo(operational tempo) and mission requirements, work-a-rounds are a must."

Preliminary Insights

The data clearly shows that the current logistics structure is extremely convoluted and unnecessarily complex. As mentioned earlier, it was built up sporadically over time as organizations and specialties were thrown together, without structural or process integration. Many "stove-pipe" structures still exist. Because integration did occur at different levels in the organization, the stove-pipe structures often have multiple people, units and processes responsible for the same thing, which inevitably leads to conflict and unnecessary redundancy.

Each type of service is provided from a different division of the organization with its own process for requesting and providing such service. Additionally, there is no centralized method for requesting services, which are instead requested by using methods that include personal relationships and/or phone calls, multiple different databases (that are not connected), chain of command, and others. Because the primary customer operates 24 hour per day, 7 days a week, there are many emergency processes in place in addition to the normal day-to-day processes. For the sake of simplicity, we have looked at the normal day-to-day processes for the commonly used services.

There are efforts to improve the organization underway at several levels. However, many of these efforts are mainly focused on organizational structures. While this should help, there are many other areas that also need improvement, and a truly lean enterprise will not be achieved without addressing all of the different aspects of the enterprise. Of course, it will be a challenge to address the processes until the structure is established (the chicken or the egg paradigm), but as the structure converges, we believe the main day-to-day processes can be refined.

Additionally, this particular CG logistics survey only addressed the operational unit stakeholders (the primary customers); however, the Maintenance and Logistics Command (MLC), Headquarters and the ISC employees are also important stakeholders that can have a large influence on the success of the organization. Therefore, additional emphasis needs to be placed on the stakeholders as well as the processes. The ultimate goal is to implement change (and thereby improvement) without harming the delicate balance of the currently working system.

The SIPOCs (Suppliers, Inputs, Process, Output, and Customer) revealed the lack of metrics for the things that the primary stakeholder (the customer) finds of greatest value. Since one performs best in the area that is measured, metrics are a logical place for improvement. In addition, there is often conflict in priorities between the ISC's leadership (MLC) and the operational unit; in order to resolve this prioritization discrepancy, any problems must be raised very high in the chain of command.

Stakeholder Value Exchange

The following figure summarizes the value exchanged between each set of stakeholders identified previously. The EVSMA Stakeholder Value Exchange templates are all summarized in pictorial form. The intensity ranking of "Must Be" represents tasks that must be performed due to a mandate of some kind (legal or otherwise). "Should Be" represents tasks that should be performed to keep the Coast Guard functioning properly, but are not mandated. "Might Be" represents tasks that might occur but are not linked with specific goals. The dashed lines are indirect relationships that affect the ISC while the solid lines are direct relationships. It became clear from analyzing the data that there is a one-sided critical value stream between the ISC and operators. The operators depend on the ISC for logistics support but the ISC does not get

anything in return and, therefore, the operators are at a disadvantage in this relationship. There is a circuitous route from the operators to the CG Leadership and then back down to the ISC, but this means that any problems must be serious enough to be pushed up the chain of command. This dynamic naturally sets a glass ceiling or threshold to what is worth correcting, which could potentially leave substantial waste hidden.

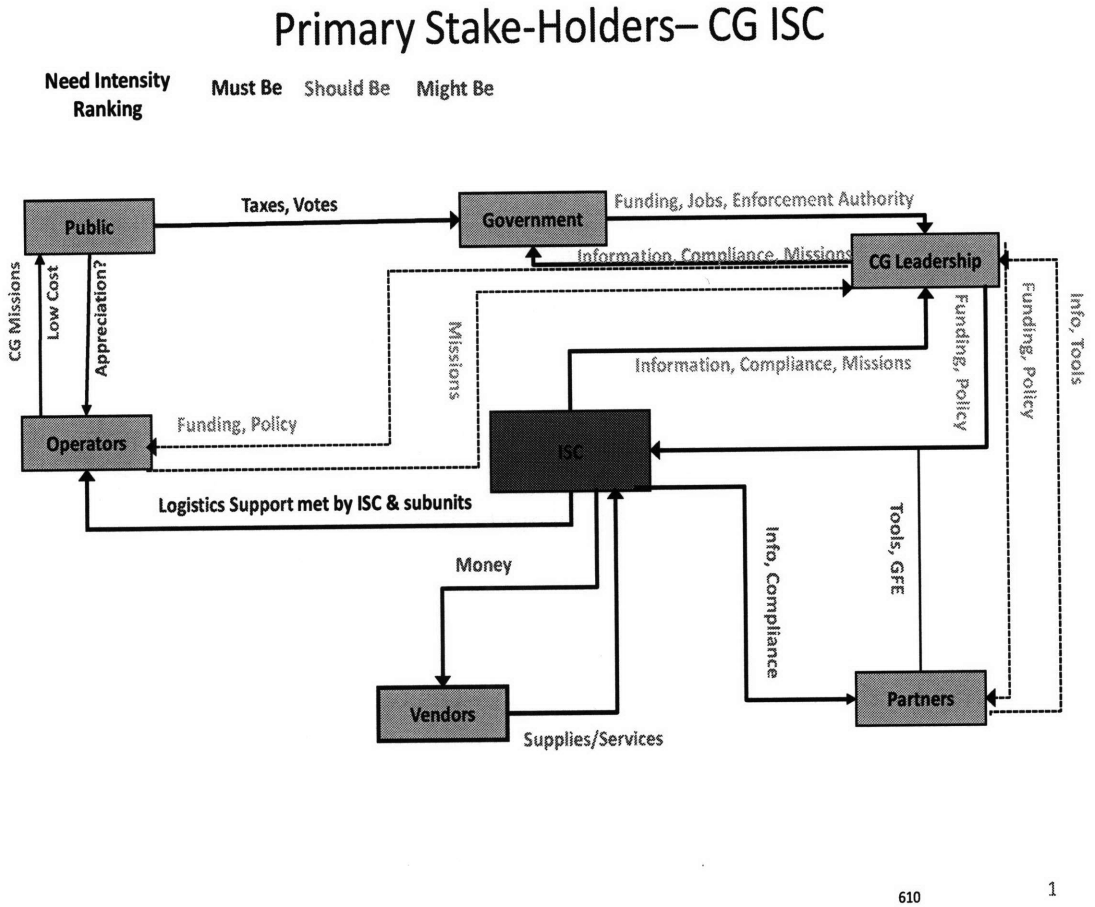

Figure 15-Stakeholder value map

This stakeholder analysis viewed with the major problem areas in mind, gives rise to broader SD. The lack of direct valued feedback from the operator to the logistics provider (ISC) is a cause of angst.

Data collected from the survey questions showed that the number one motivation for the respondents was mission accomplishment and number two was evaluation and/or recognition.

These statements, give the impression of highly driven "doers" who enjoy the ability to act independently, pride themselves in always "answering the bell" and are likely to seek the simplest, fastest way to a solution. The statements also convey a great concern for the organization's missions, people and health, though those values were often interpreted in different ways. These are good, hardworking, talented people.

The ISC transfers information, resources and materials depending on the service provided. They excel in those areas that are measured by daily metrics, which are reviewed up the chain. These areas are generally focused on the relationship between the ISC and the CG leadership. The interactions between the ISC and the operator are one-sided, no consistent metrics exist to monitor their quality and, therefore, there is no impetus for them to perform well. A glance at the system interfaces between ISC and operators reveals mixed messages. The Coast Guard leadership pushes the operator to complete the mission. Simultaneously, the ISC is being pushed toward compliance with standard processes and procedures. When there is an emergency, there is no conflict because everyone's direction becomes mission accomplishment. In normal, day-to-day operations, conflicts arise regularly between doing the mission and following process and/or procedure. The resolution of this conflict has become the operator work-a-round. This tendency to take short cuts is probably due to a lack of formal feedback mechanism to the logistics organization. There are no metrics that tracks the relationship between many of the partners and the ISC. Since it is known that many of the support functions are shared between partners, the operators themselves and the ISC, accountability for poor service seems to be an issue. The partner organizations also hold great sway over the processes, procedures and tools used by both the operator and the ISC for getting the mission done. Feedback for process improvement is unclear in this relationship. Most task direction for these organizations comes from up their hierarchical chain of command, Coast Guard Headquarters. Coast Guard Headquarters is the most removed unit from the operator within the Coast Guard further alienating the operators.

Very few operational leaders are going to say "no" to readiness as a push back to make the Coast Guard logistics system deliver as designed, either out of personal concern for higher command, disapproval, or devotion to urgent mission responses. Some quotes we noted:

> "I will use any and all assets necessary to ensure mission completion and mission success."
>
> "It's the culture I've been raised in and have become very good at it. Getting the support I need when I need it would certainly allow me to focus on the mission and spend less time calling friends, begging, borrowing and stealing."

More disconnects noted: The operators are on a 24 hour per day, 7 days a week schedule, while most support organizations have limited work hours, though some have an on-call person. If the logistics services begin to fail or decline, the need of the operators does not go away and, as they have a bias for action, they will generally find a way to get the job done bypassing the logistics system. This creates a culture where "local heroes" will prevail in meeting mission readiness, despite a host of setbacks: a collusion of asset or personnel casualties, a shortage of available training or a harsh transfer season, heavy taxing of unit funds just ahead of a scheduled maintenance period, and so on. When these local heroes manage to meet and/or exceed expectations by finding discrete work-a-rounds, the system is set up to give them praise, recognition and favorable evaluations for being resourceful. By contrast, many participants overwhelmingly cited high personal risk for any leader who was to say "no" to mission readiness while waiting for certain mandated or prescribed services to be delivered. Because there is no feedback loop, many reported that holding service providers accountable was too time consuming and frequently fruitless, as the system was too complex (too many other units, organizations, or both within the process to establish cause).

On the positive side: Those logistical organizations that had a close personal relationship, where a single point of contact took responsibility for handling service needs to completion or as the need recurred, were reported as being high-performing. The work-life staff, as well as the port engineer, both fell into this category. When providers and consumers are accessible to one another and mutually accountable for the ultimate mission accomplishment and care or resources, performance improves, along with satisfaction. In addition, trust is realized and accountability is seen in a positive light, and not as a coercive reaction to failure.

"Food Service personal stake their success as it is immediately visible as measured 3 times a day during meals."

Enterprise Metrics

The metrics of an enterprise identify the current state, whether the enterprise is improving or performance is deteriorating. The metrics are important because they are typically used for identifying areas of improvement and example areas that are doing well. The current state of the ISC Boston metrics, as well as potential future metrics, is included here.

Current Metric Trends

The primary metric system of the ISC is the ISC scorecard. The scorecard tracks the percentage of people who are up to date on the following:

- Dental
- Physical exams

- Immunizations
- Weigh-ins
- Required clearance
- IDP First Term Mil (number of first term members who have been counseled on career plans)

These metrics are tracked and updated daily, but are not looked at as frequently; instead, they are looked at on a weekly and/or monthly basis. Overall, these metrics remain relatively constant; people are notified when they need to complete something, and the general trend is constant.

In addition to the actual, tracked, scorecard metrics, ISC has also developed a "balance scorecard" to attempt to measure things related to their strategic goals and objectives. This scorecard expands the measures and performance metrics to include:

- Reserve immunizations (readiness)
- Housing occupancy rate
- District 1 staff account reconciliation
- Safety mishaps
- Select and direct responses
- Environmental
- Industrial Service Orders (ISOs) completed on schedule
- Housing maintenance
- Government Vehicles (GV) management
- Facilities management
- Customer survey responses
- Compliance with General Military Training
- Small boat coxswain training and certifications
- Coast Guard Mutual Assistance (CGMA) turnaround, loans and grants from within the organization
- Galley market share
- Financial Accounts status

While this "balanced scorecard" vastly expands upon the current scorecard metrics, it is still focused on the requirements from leadership and not on enterprise goals and objectives. Also, some are currently measurable (number of safety mishaps, ISO's completed on schedule, housing occupancy rate), but others do not have a definitive performance measurement (such as environmental, facilities management). Due to the disconnect among goals, measurements, and analysis of performance measurement, it is difficult to accurately assess the trends of many of these metrics.

Performance Metric Quality

A good performance metric satisfies three broad categories: it is strategic, quantitative, and qualitative. A metric being strategic indicates that it measures how well the strategic objectives are being met, and provides a suggestion of how to change in order to improve those strategic goals. It also means that the metrics mimic the priorities of the overall enterprise. A quantitative metric is one that provides an understanding of the status, progress and rate of improvement; in other words, it is quantifiable and measurable to mark progress. A qualitative metric is perceived to be of value to the members and stakeholders of the enterprise; it is agreed upon as important. Truly good metrics possess all three of these qualities, and all metrics should address each point to some extent.

Unfortunately, ISC metrics do not fully meet the aforementioned standards of "quality metrics". The current metrics (scorecard) are quantitative and measurable, but lack the qualitative (importance) and strategic aspects of good metrics. To some extent, the metrics are strategic; they support the goal of the ISC to track the performance in such areas, but only support a limited aspect of the strategic objective. This may be okay when there are other metrics supporting the other strategic objectives, but these metrics are not adequate on their own. Similarly, it is recognized that the scorecard metrics are important; people must have immunizations, etc., but they do not represent the top priorities of the enterprise (which is to provide quality logistical support and services to the CG). Therefore, while the scorecard metrics may be acceptable in conjunction with a number of other broader, enterprise-level metrics, they are not adequate for the ISC Boston enterprise.

Performance Metric Flow Down

Since the current metrics to do not address all of the strategic objectives of the enterprise, they also do not logically flow from the objectives to each level of the organization. Ideally, the high level strategic objectives map to high-level performance metrics. Then, each lower level of the organization has performance metrics that can be traced to the higher level metrics and ultimately to the strategic goals. This is not the currently the case.

Additional Insights

The above assessment of the enterprise metrics is rather bleak; the metrics that are measured are okay, but they are not enough to measure the performance of the enterprise. However, the entire story is not as bad as it initially seems; there are current efforts underway to help improve the situation.

First, many of the individual groups within the ISC (ESU, NESU, etc.) have their own internal metrics that focus more on operator satisfaction, number of open items, response time,

etc. While these metrics are not yet standardized across the enterprise, they do exist on some level, and can thus be expanded across the enterprise to provide better metrics and performance.

The recent ISC survey has provided a great amount of good data on the performance of the enterprise. The survey essentially represented metrics that map more closely to the major strategic objective (providing quality service to the operators), and are of better "metric quality" than the scorecard alone. The metrics are clearly strategic in that they support the major goal of the enterprise, they are quantitative in that they were measured (although on a relative scale), and they are valuable and qualitative. The only issue with these metrics is that they were obtained though a major, one-time survey, and it may, therefore, be difficult to continually update the metrics, track their changes, and identify how the enterprise is progressing. Despite these difficulties, the metrics can give a good sense of current areas for improvement and potentially identify areas in which metrics are needed.

The full data set from the survey is too large to present here, but some of the major results have been summarized throughout this thesis.

X-Matrix Evaluation

The X-matrix can provide a visual interpretation of the relationships between four very important enterprise characteristics: strategic objectives, enterprise metrics, key processes and stakeholder values. These four things are clearly very important to the success of the enterprise, and their interrelationships, alignment and connections can drive (or hinder) that success. A big picture overview of the Coast Guard ISC matrix is shown below:

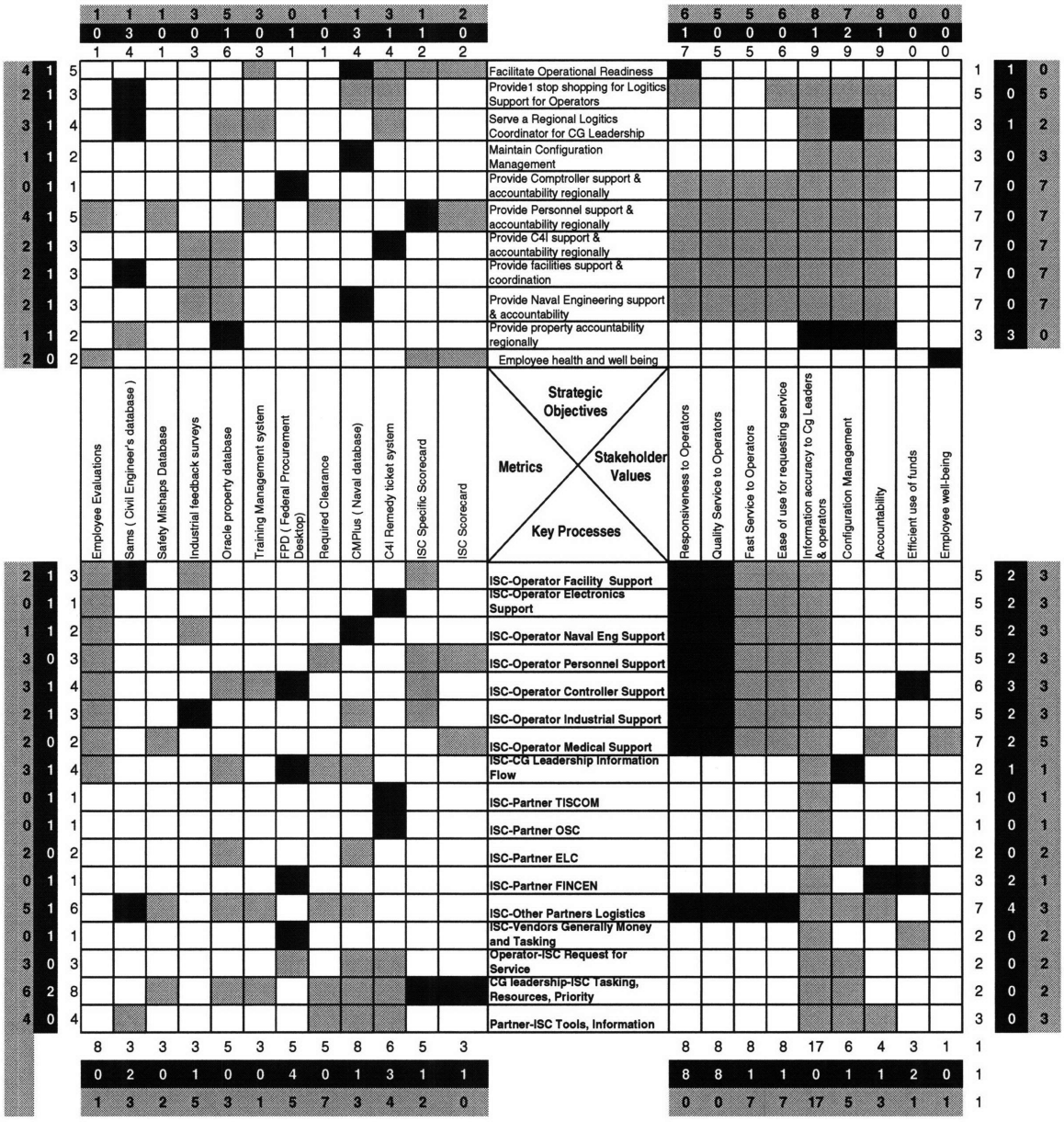

Table 7-X-Matrix

At the top of the table are the strategic objectives, to the left are enterprise metrics, at the bottom are key processes, and to the right are stakeholder values. The boxes between each two things represent the couplings. The yellow boxes indicate weak interactions, the blue boxes indicate strong interactions, and the white boxes indicate no interactions. To gain a better understanding of how this affects the enterprise, the quadrants will be examined individually. The numbers at the end of each column and row indicates how many strong and weak interactions that are for that particular line item.

Quadrant 1: Strategic Objectives and Metric

The first quadrant, relating the strategic objectives to the enterprise metrics, is shown below. Each square answers the question: "Is this strategic objective addressed by this metric?"

			1	1	1	3	5	3	0	1	1	3	1	2
			0	3	0	0	1	0	1	0	3	1	1	0
			1	4	1	3	6	3	1	1	4	4	2	2
4	1	5												Facilitate Operational Readiness
2	1	3												Provide1 stop shopping for Logitics Support for Operators
3	1	4												Serve a Regional Logitics Coordinator for CG Leadership
1	1	2												Maintain Configuration Management
0	1	1												Provide Comptroller support & accountability regionally
4	1	5												Provide Personnel support & accountability regionally
2	1	3												Provide C4I support & accountability regionally
2	1	3												Provide facilities support & coordination
2	1	3												Provide Naval Engineering support & accountability
1	1	2												Provide property accountability regionally
2	0	2												Employee health and well being
			Employee Evaluations	Sams (Civil Engineer's database)	Safety Mishaps Database	Industrial feedback surveys	Oracle property database	Training Management system	FPD (Federal Procurement Desktop)	Required Clearance	CMPlus (Naval database)	C4I Remedy ticket system	ISC Specific Scorecard	ISC Scorecard	Strategic Objectives / Metrics / Stakeholder Values / Key Processes

Table 8- X-Matrix 1st Quadrant

As a whole, the strategic objectives support the mission of the Coast Guard ISC. The objectives are good and would allow ISC to meet its needs; nevertheless, the interactions with the metrics beg some examination.

At first glance, the first quadrant seems to be acceptably populated; each strategic objective is supported by at least one metric. However, these metrics are individual databases, kept within individual sections of ISC, and are often not monitored, as discussed above.

Some key interactions are identified below:

- "Facilitating operational readiness," which is a major strategic objective of the ISC, is supported by the ISC scorecard (one of the very few metrics that prevails across all of the ISC) and by the naval and industrial database. However, there are some missing interactions; operational readiness should be supported across all of the ISC functions, and should therefore have many more metric interactions than exist.
- Similarly, the second major strategic objective is to provide a single source of logistical services. There are metrics identified as supporting this goal for specific parts of ISC, but the lack of consistency across the organization is clear from the lack of interactions throughout all of the ISC components. This lack has manifested itself in a tendency for the operators or other partners and vendors to have responsibility for inherently logistical functions, which lessens accountability, control, and may, in some cases, produce a redundancy in effort.
- Configuration management is another strategic objective that should be common to all ISC components (or components of any organization). Thus, the lack of interactions with the metrics which correspond to individual components is telling. Configuration management is only tracked as a metric in select portions of the ISC (particularly the property and naval databases). A lack of configuration management has been one of the major issues the ISC has faced. Tying configuration management with funding and some other strategic objectives in a common metric might facilitate better control.
- Contrary to the previous objectives, "providing personnel support" is supported by a number of metrics that range across the organization; therefore, the current system does provide the metrics to assess personnel support (though it may not be done in the most efficient manner). There is no metric that really addresses quality of support from the perspective of the primary customer (operator), which is why timeliness, responsiveness, and accountability have been described in surveys as major areas needing improvement.
- A number of the other strategic objectives correspond directly to a specific function of the ISC, for example: comptroller support, facility support, naval engineering support, etc. For the most part, each of these functions has a database (i.e., metric) to support it. There are a few cases in which several metrics support it, but for the most part, there is one major metric. This highlights the fact that the ISC is currently rather disjointed. Each objective has a metric measured under a different system, which can cause confusion and takes away from the "one-stop logistics shop" that the ISC would like to be. Also, the database allows for these metrics and others to be pulled and reviewed, but the frequency, level of review, and audience of review are not addressed by this matrix.
- The major, tracked metric is the ISC scorecard, but the scorecard only weakly supports three strategic objectives. Therefore, this may not be the single most important metric to track (as is currently being done).

This portion of the X-matrix identifies a few key issues. Mainly, the strategic objectives support the ISC goals, and there are databases and/or metrics for these objectives. However, these databases are compartmentalized and not common across the organization; therefore, although the interactions appear to exist, they are inefficient and could be greatly improved.

Also, the desire for a single logistics source and strong configuration management is not supported by the metrics. Commonality across the organization is a major area for improvement. A second major issue that is not immediately visible is the lack of tracking of the metrics. Though the metrics exist, they are not necessarily consistently tracked or utilized; therefore, a second major area for improvement is in metric utilization and exploitation. Finally, there seems to be no metrics that really quantify the quality of support; for instance, how much time it takes between a procurement request and the comptroller ordering, etc. Without established goals and these types of quality metrics, a services unit may provide service while not meeting customer expectations on numerous fronts. This is the situation the ISC has found itself in. With some clear goals on quality of service for employees, and with the CG leadership and customer all on the same page, meeting the mark is easier. Without these, ISC is attempting to meet each person's arbitrary expectation of performance and will inevitably fail to meet expectations.

Quadrant 2: Metrics and Key Processes

The second quadrant, relating the enterprise metrics to the key processes, is shown below. Each square answers the question: "Does this metric measure this process?"

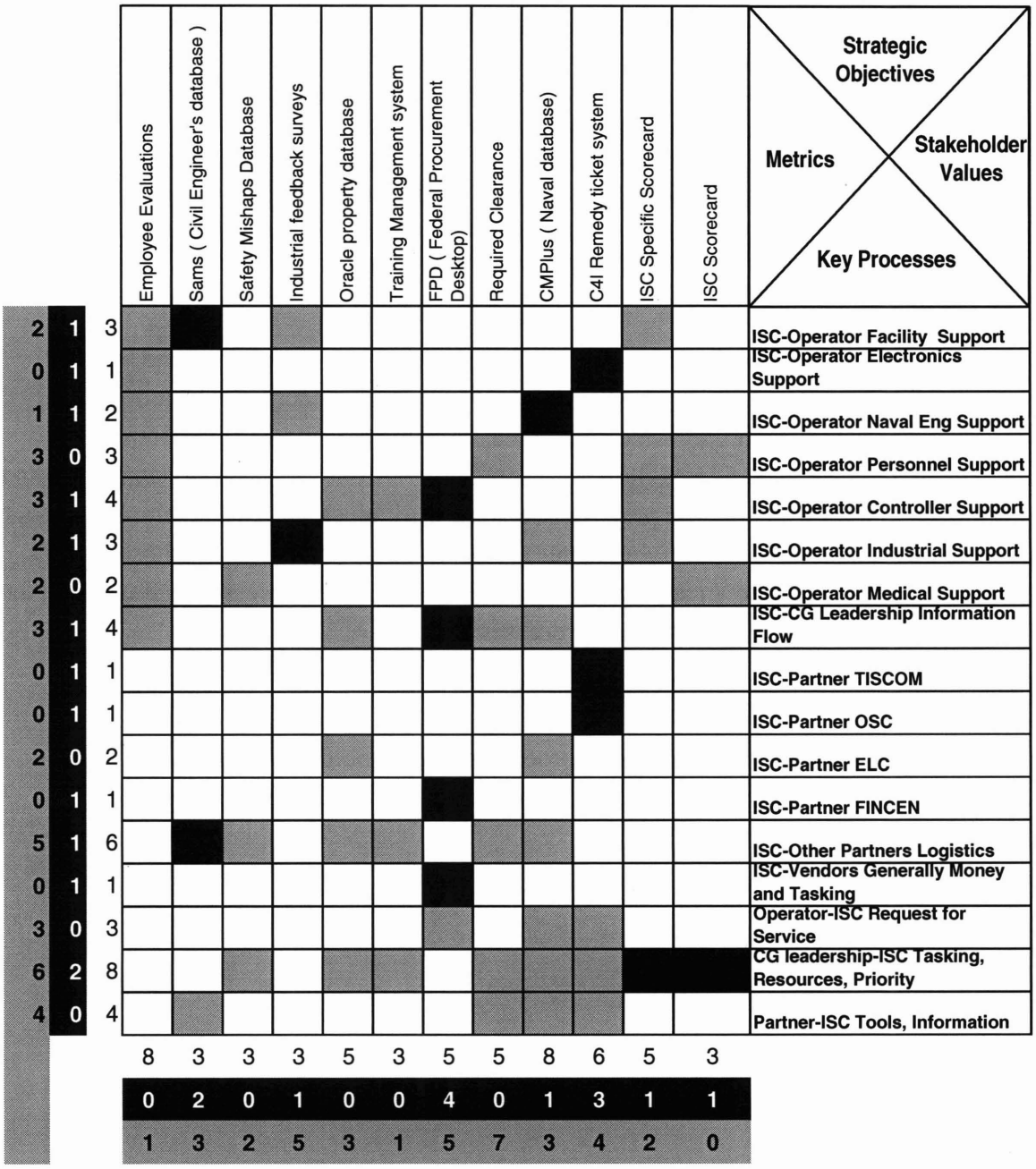

Table 9-X-Matrix 2nd Quadrant

As indicated in the previous section, the current metrics are not entirely appropriate for the organization. Regardless, they are analyzed in conjunction with the major enterprise processes. The enterprise processes are organized into the major ISC processes (facilities, electronics, naval, personnel, comptroller, industrial and medical support), ISC-partner relationships, ISC-supplier relations, and ISC-leadership relations. This quadrant of the x-matrix can identify some of the interactions between the metrics and processes, and are identified below:

- Each of the ISC internal processes (electronics, etc.) has essentially a single database metric. This is consistent with the above section; the metrics, though they exist, are disjointed and not consistent across the organization. This results in one metric and/or database per process, and lacks the desired consistency.
- The partner processes are supported by the metrics corresponding to which ISC component they partner with (example: TISCOM and OCS partner with ISC-ESU and uses the C41 Remedy Ticket system, while FINCEN uses the procurement database that the comptroller uses). This again is indicative of the stove-piped organization.

Again, there is a lack of good metrics, consistent goals for the metrics and synergy between the metrics. Also, some or most of these metrics measure activities, but do not effectively measure how well they were performed, which is the crux of the operators' complaints. The ones that do address how well something is done are generally applied from the CG leadership to the ISC, and these processes seem to work much better. Therefore, the biggest areas for improvement are in identifying better metrics, setting clear goals for those metrics, making them viewable up, down and across all stakeholders in the processes, and utilizing these to tie together the strategic objectives and processes.

Quadrant 3: Key Processes and Stakeholder Values

The third quadrant, relating the key processes to stakeholder values, is shown below. Each square answers the question: "Does this process contribute to the delivery of this stakeholder value?"

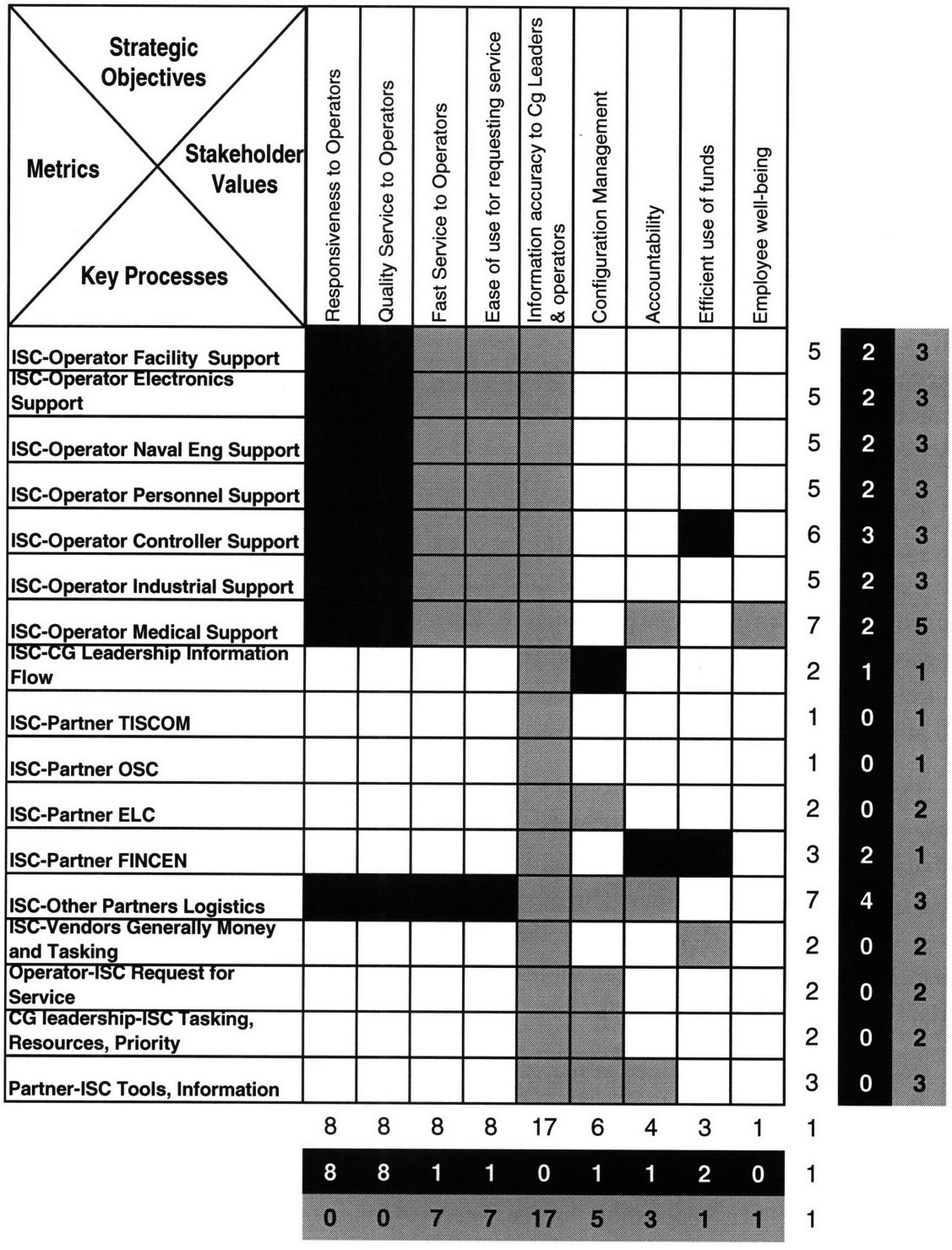

Table 10-X-Matrix 3rd Quadrant

As the ISC is a support organization for the Coast Guard operators, it is sensible that the various ISC processes are direct contributors to the delivery of "responsiveness to operators" and "quality service to operators".

The third quadrant of the X-matrix indicates that there are many processes that contribute to the quality of service for the operator, the ISC's primary customer. That is clear from the large block of blue and yellow seen in the X-Matrix. Although these processes contribute to responsiveness, quality of service, etc., the metric does not measure them. The result is that a service unit may work, but there is a misalignment between the customer's expectation of quality service and what the service provider feels is quality service. The ISC processes weakly contribute to the ease of use of service requests because customers must contact the ISC through the ISC's various databases. All of the ISC processes contribute to the delivery of information accuracy to Coast Guard leadership, but the contribution is indirect because information delivery is not necessarily the primary mission of the ISC processes (even though Coast Guard leadership is very interested in accurate information).

One important point of note is that none of the primary ISC processes contribute to the delivery of configuration management. This suggests that the processes are missing functionality (specifically, the ability to create and maintain harmonized configurations), which could contribute positively to enterprise performance. Currently, Coast Guard leadership, with the assistance of a few partners, is tasked primarily with implementing configuration management. Also, accountability is not delivered by many of the ISC processes, and FINCEN (financial) is tasked primarily with accountability delivery.

One can draw similar conclusions regarding the delivery of efficient funds usage and employee well-being. It is possible to make an argument that all the ISC processes should contribute at least in a small way to the delivery of these values, as a broad adoption of efficient funds usage practices can contribute directly to the "leaning" of the Coast Guard ISC, and an increase in employee well-being can directly improve enterprise performance. In this third quadrant, the X-matrix clearly indicates a failure of specific processes to deliver specific important values to stakeholders.

In categorizing evaluations, a major process in the organization, it was unclear whether they fall under processes or metrics. Evaluations determine future jobs, pay, and almost every aspect of an employee's life, but they are generally reviewed by individuals and an individual's chain of command, and are then holistically evaluated by CG leadership to look for trends on performance, etc. Since (according to the surveys) many people are motivated by their evaluation, it was thought that they might have an impact on quality of service (if there were set goals in place).

Looking down the scale (Table 9), 17 is assigned to information accuracy. This is a CG leadership value, has the most processes and appears to be the most important value. It is

questionable whether this alignment is intentional, or if this is an indication of a misalignment of processes and stakeholder values.

Quadrant 4: Stakeholder Values and Strategic Objectives

The fourth quadrant, relating the stakeholder values to the strategic objectives, is shown below. Each square answers the question: "Is this stakeholder value represented by this strategic objective?"

	6	5	5	6	8	7	8	0	0			
	1	0	0	0	1	2	1	0	0			
	7	5	5	6	9	9	9	0	0			
Facilitate Operational Readiness	■									1	1	0
Provide1 stop shopping for Logitics Support for Operators	■			■	■	■	■			5	0	5
Serve as Regional Logitics Coordinator for CG Leadership					■	■	■			3	1	2
Maintain Configuration Management					■	■	■			3	0	3
Provide Comptroller support & accountability regionally	■	■	■	■	■	■	■			7	0	7
Provide Personnel support & accountability regionally	■	■	■	■	■	■	■			7	0	7
Provide C4I support & accountability regionally	■	■	■	■	■	■	■			7	0	7
Provide facilities support & coordination	■	■	■	■	■	■	■			7	0	7
Provide Naval Engineering support & accountability	■	■	■	■	■	■	■			7	0	7
Provide property accountability regionally					■	■	■			3	3	0
Employee health and well being									■			
Strategic Objectives / **Metrics** / **Stakeholder Values** / **Key Processes**	Responsiveness to Operators	Quality Service to Operators	Fast Service to Operators	Ease of use for requesting service	Information accuracy to Cg Leaders & operators	Configuration Management	Accountability	Efficient use of funds	Employee well-being			

Table 11-X-Matrix 4th Quadrant

Quadrant 4 indicates the weak relation between the last two stakeholder values and a number of stated strategic objectives. Ideally, one might wish for enterprise strategic objectives

to be strongly aligned with stakeholder values, which would indicate an enterprise focused on delivering value directly to stakeholders. While two strategic objectives align very well with some stakeholder values ("Responsiveness to operators" and "Employee well-being"), most objectives have a weak alignment. Addressing these areas through better metrics would be the key. Generally, the strategic objectives are legacy objectives directly related to the stove-piped nature of the ISC. They focus on providing support to specific processes such as comptroller and personnel, and do not take a broader view of support to stakeholders.

The most glaring relationship omission is that of "Efficient use of funds", which has no relationship with any of the stated strategic objectives of the Coast Guard ISC. This suggests that the ISC either does not value the efficient usage of funds, or expects another stakeholder (such as Coast Guard leadership, shown in Quadrant 3) to optimize funds usage. We think that this stems from the notion of, "What is efficient use of funds?", "Would an efficient usage be to optimize mission performance (the operators' point of view)," or "Would it be to optimize configuration management (long-term strategic view)?" There are certainly laws within the comptroller realm that force a choice of low bidder or some semblance of optimal contractor, but these laws govern specific purchases. For instance, if a customer requests something and has the money, is it procured? Is the request studied to determine if it is healthy for the long-term goals of the ISC? Does the operator spend money on logistics when similar services are available within the ISC? These are questions that efficient use metrics should answer.

Enterprise Opportunities

Thus far, the enterprise has been analyzed to determine its current state. The following section will use this data to identify opportunities. To begin, a Lean Enterprise Self Assessment Tool (LESAT) analysis was performed, and is described below.

LESAT Assessment

For the LESAT, we surveyed the department heads of the major processes we have been evaluating: the Naval Engineering Unit, the Electronic Engineering Unit, the Comptroller, the Personnel Department, the Industrial Department and the Medical Department. This survey revealed some new and interesting information about leadership within the changing organization, whereas most of our evaluation has been on the primary customer relations and processes. The survey was sent out Sunday night and returned by most parties by Wednesday morning; the final survey was returned early Thursday.

Organization of LESAT Maturity Matrices

Section I – Lean Transformation/Leadership
I.A Enterprise Strategic Planning (3 Lean practices)
I.B Adopt Lean Paradigm (4 Lean practices)
I.C Focus on the Value Stream (4 Lean practices)
I.D Develop Lean Structure and Behavior (7 Lean practices)
I.E Create and Refine Transformation Plan (3 Lean practices)
I.F Implement Lean Initiatives (2 Lean practices)
I.G Focus on Continuous Improvement (5 Lean practices)

Section II – Life-Cycle Processes
II.A Business Acquisition and Program Management (4 Lean practices)
II.B Requirements Definition (2 Lean practices)
II.C Develop Product and Process (3 Lean practices)
II.D Manage Supply Chain (3 Lean practices)
II.E Produce Product (2 Lean practices)
II.F Distribute and Service Product (4 Lean practices)

Section III – Enabling Infrastructure Processes
III.A Lean Organizational Enablers (5 Lean practices)
III.B Lean Process Enablers (3 Lean practices)

Figure 16-LESAT survey.

	Generic Definition
Level 1	Some awareness of this practice; sporadic improvement activities may be underway in a few areas.
Level 2	General awareness; informal approach deployed in a few areas with varying degrees of effectiveness and sustainment.
Level 3	A systematic approach/methodology deployed in varying stages across most areas; facilitated with metrics; good sustainment.
Level 4	On-going refinement and continuous improvement across the enterprise; improvement gains are sustained.
Level 5	Exceptional, well-defined, innovative approach is fully deployed across the extended enterprise (across internal and external value streams); recognized as best practice.

Table 12-LESAT level definitions

The table and figure above contain the categories of the questions asked, as well as the meaning behind number values associated with each of the questions. The table below summarizes the perceived current state according to the department heads. We can see that the

mean is 2.5, which corresponds to a general awareness of lean with a few informal prototypes, but nothing substantial. This is what we expected from all the other data that we have acquired thus far. Each department has its own processes and measures. There is a general desire within the departments to match those measures to their primary customer values. However, since all of their processes are tied to the enterprise partners, in most cases, departments have been very limited in the process deployment. Since most of the strategic guidance and standard processes come from the CG leadership, the departments have been limited in their ability to apply lean throughout their organization in a concerted, organized manner, until now. We see that the variance is 0.8, which implies that most departments agree. With a range of 2.1, there are some departments that have more latitude than others, which accounts for this disparity. Also of note is the fact that each section is almost identical in mean, variance, and enabling infrastructure. This shows that the limited lean effort at the corporate strategic level is replicated in life cycle processes as well as enabling infrastructure.

Current State - Overall LESAT Score			
	Mean	Variance	Range
Current	2.5	0.8	2.1

CURRENT STATE - LESAT Section Scores											
Section I - Lean				Section II - Life Cycle Processes				Section III - Enabling Infrastructure			
	Mean	Variance	Range		Mean	Variance	Range		Mean	Variance	Range
Current	2.5	0.8	2.1	Current	2.4	0.8	2.1	Current	2.6	0.7	2.1

Table 13-LESAT Current State

The table below shows the overall results of the LESAT for desired state. We see a strong and consistent desire for the department heads to move aggressively towards a lean program. According to the numbers, the department heads want to implement lean throughout the entire organization, with continuing improvement as the ultimate goal. This is also very much expected from our meetings with the interviewers and our understanding of the "culture" within the organization. On the surveys, we noted that the motivation of the operators is mission accomplishment. It only makes sense that the same motivation should be true for the logistics personnel, as people switch from operator to logistics several times during a career. What was surprising were the relatively high mean values for lean organizational enablers. After some thought, we came to realize that the tools available are very powerful. Although the tools are cumbersome for the operator, they are quite functional for the professional logistics person.

Desired State - Overall LESAT Score			
	Mean	Variance	Range
Desired	4.6	0.4	1.4

DESIRED STATE - LESAT Section Scores											
Section I - Lean				Section II - Life Cycle Processes				Section III - Enabling Infrastructure			
	Mean	Variance	Range		Mean	Variance	Range		Mean	Variance	Range
Desired	4.7	0.3	1.1	Desired	4.5	0.6	1.6	Desired	4.5	0.5	1.6

Table 14-LESAT Desired State

Enterprise Waste

Waste in the enterprise is also identified. It is divided into six categories: customer, supplier, information flow, processes, and organizational structure.

Customers: (Opportunity costs from lack of cooperation and coordination, Excessive mandated requirements creating lack of flexibility).

a. **Lack of metrics between partner organizations and the ISC leads to waste.** From the X-Matrix, it became clear that there is a lack of defined communication paths, measured metrics, or strong feedback mechanisms for process improvement between the ISC and several partner agencies within the CG. Because the data is not shared easily, they often have last minute data calls which create non-valued added waste by collecting data that already exists. We also noted the "reinvention of the wheel", in that stove-piped departments all had some of the same issues, found separate solutions, and implemented those solutions separately from each other and partner organizations. An example would be the Industrial Work Order Database.

b. **Lack of feedback between operators and the ISC leads to waste.** The surveys pointed out that many of the services that the ISC provides are also provided by the operators own staff. This leads to redundant effort, mismatched quality, and a lack of accountability. With many different people responsible for the same thing, finding an error in a process and correcting it throughout the organization becomes a consensus exercise that is a challenge to both organize and implement. Therefore, many wasteful things which could be corrected are not. This also appeared in surveys where members reported their perceived inability to influence change or correct mistakes.

c. **Lack of customer validation on requirements.** As noted from the Value Stream diagram, feedback from the primary customer to the ISC does not exist. They request services or services are provided to them, but those services are often determined by the CG leadership. The operator has very little say in what services they want and how they want them. This leads to mismatched expectations and wasted effort, which can be seen in the Industrial Process Flow diagram where the operator can have work scheduled anywhere from within 2 weeks to 2 years. The highly dynamic operational schedule and no real input on when the work is scheduled leads to less than optimal work.

Suppliers: (Inventory, Inadequate metrics for efficient performance assessment).

a. **Inadequate metrics lead to unused or overused inventory.** In most cases, the vendors provide services and parts to the operators. The ISC facilitates this exchange via the comptroller. One of the worst systems the operators identified is the federal procurement desktop (FPD). This is the primary tool the operators use to document their requirements to the comptroller, who then follows the many complex rules and/or laws associated with government procurement to buy what is needed. The complaints were that the system is time consuming and difficult, which produces waste because the operators have to spend a lot of time navigating and using this unfriendly system rather than focusing on the CG Mission.

b. **Lack of control and therefore lack of accountability for inventory.** Due to the stovepipe systems and distributed responsibilities, three different units may have a spare for the same operational part because they are unaware that the other units have those spares. The limited cross-unit visibility creates a lot of waste in spare parts.

c. **Lack of process control when commercial supplies delivered**. The metrics on quality of service are limited. Items ordered by the comptroller are generally received by the operator. When those items are received is not tracked closely, which leads to multiple undesirable outcomes. First, vendors can receive payments late, and therefore fine the organization, which is wasteful. Second, vendors can receive payment before all the supplies have been delivered, giving them no incentive to deliver, or vendors may simply miss the required delivery date, thereby causing the customer to wait with no consequences (since nothing is tracked). All of these scenarios are possible and happen due to lack of metrics and cohesive data integration.

d. **Lack of coordination**: There are instances when the operational customer has the expertise on the requested item, but the comptroller has the expertise and/or implements the procurement process. When ordering, the operational customer is not present to assist with negotiations (if and/or when there are vendor options). This can lead to waste.

Information Flow: (Over-processing information).

a. **Stove-Pipe Information Systems**: Lean manufacturing identified seven types of waste: over-production, excessive inventory, unnecessary transportation, defect correction and/or re-work, unnecessary motion, inappropriate processing and waiting. To apply them to the information flow, we need to identify the over-processed information, unavailability or untimely information, wrong information, etc. Because the ISC's systems are all separate, it often takes manual intervention to get information from one system to another (waste). One example is that the procurement system is not tied to the inventory system. This takes many man-hours to re-enter data into property inventories. There are many cases in their processes where this takes place; the Safety Mishaps Database and the Training Management system both keep personnel support and accountability information; Sams (Civil Engineering Database) and Oracle property database have an overlap on facilities support information; both Oracle property database and CMPlus keep the engineering support and accountability information; Oracle property database also has an overlap with C4I Remedy ticket system on C4I support and accountability. We need to make the same update on the same information in more than one database.

b. **Lack of metrics on information flow leads to waste:** There are processes between the ISC and the operators, and also between the ISC and the partners. These processes yield information and materials which should be measured in some quantitative fashion by metrics set against them. The databases capture a lot of metrics; however, many of them are not used, and are inconsistent between processes.

Processes: (Structural inefficiencies in the enterprise process model).

a. **Lack of stakeholder input (specifically, customer input) in some processes causes waste:** The ISC has a number of stakeholders, such as customers, employees, Coast Guard leadership, vendors, and the United States public. While the ultimate goal of the ISC is to help the operators serve the US public, only the Coast Guard leadership has direct input to the ISC (through issuing of commands, the providing of funds, and the requirement of reporting). The customers only sometimes have the opportunity to communicate their feelings about the ISC's effectiveness; the survey the LOAT conducted is an example of one such opportunity. Because customers rarely have the chance to provide structured feedback to the ISC, waste is generated in the form of an inability on the part of the ISC to effectively meet customer needs and predict arising needs.

b. **Lack of standard processes causes waste**: The ISC has a number of processes (represented by various sub-organizations such as Naval Engineering Support). Many of these processes have their own separate databases, indicating the ISC's stove-piped nature. Partner sub-organizations use the databases of the processes

that they partner with. Though it is true that the ISC's processes support a variety of needs, the usage of separate databases for each need likely leads to waste due to higher maintenance costs, lack of standard data formats, and lack of interoperability between databases.

On a higher level, the need for customers to contact different ISC sub-organizations for different kinds of support may also lead to substantial waste, as customers must keep various sets of contact information and be aware of a variety of cycle times associated with the different processes.

c. **Lack of metrics on some processes causes waste**: The ISC's processes often each use a single metric that correlates directly with their individual databases. Just like the databases themselves, these metrics are not consistent, which leads to waste through a lack of common measurement standards. A lack of common measurement standards can, in turn, lead to disparate stakeholder perspectives on process performance and ultimately enterprise strategic vision, producing more waste through disagreements in decision-making.

   Additionally, the processes do not have explicit metrics that measure operator and/or customer satisfaction, leading to waste through a lack of knowledge regarding customer needs and an ultimate inability to serve those needs effectively. The result of the lack of customer satisfaction metrics was highlighted previously, where customers rated timeliness, responsiveness, and awareness as the top three ISC aspects needing improvement.

Leadership: (Opportunity costs of untapped talent, Inefficient use of metrics for managing the enterprise, Poor metrics definition and structure, Excessive layers of management).

a. **Misaligned strategy:** As we noted from the Value Stream and X-matrix, the CG leadership has one strategic vision for the ISC to manage configuration management and process control. They have another for the operators, which is to get the mission done regardless of process (perceived mandate found during surveys). This mismatch in strategies creates waste at the lower levels of the organization.

b. **Poor metrics definition and structure allows waste generation in Coast Guard divisions:** The primary metric system of the ISC is the ISC scorecard. The scorecard tracks the percentage of people who are up-to-date on medical issues so that they are ready to deploy. The ISC has added to those metrics, but who is looking at the metrics, and when, remains a question. The metrics do not line up well with primary customer expectations. These are still focused on the

requirements from leadership and not on enterprise goals and objectives. Also, some are currently measurable (the number of safety mishaps, Industrial Service Orders [ISO's] completed on schedule, housing occupancy rate), but others do not have a definitive performance measurement (environmental, facilities management). With this disconnect between the goals, measurements, and analysis of performance measurement, it is difficult to accurately assess the trends of many of these metrics. Also, what is the feedback mechanism for the metric? Clearly, CG leadership metrics are tracked and feedback is decisive; action is taken to get them back on track toward their goal. The department-specific metrics, which are closer to the user, are not looked at in most cases at the higher levels and, therefore, decisive feedback to get them closer to goals (which are not standard) are not in place.

Coast Guard performance metrics and strategic goals are listed previously. Based on these metrics, it is very difficult to assess whether or not the strategic goals and objectives are being met. The ISC scorecard only accounts for the "track and measure" objective. While this is important, it ignores the other six major objectives. The expanded scorecard begins to touch upon some of the customer support, but still in a minimal, limited manner. In terms of the metrics being measured, i.e., the scorecard measures for dental, physical, etc., the enterprise is doing relatively well. Most quantities are rather high, and those that are not are highlighted for future improvement. The current metrics (scorecard) are quantitative and measurable, but lacking in the qualitative (importance) and strategic aspects of good metrics. To some extent, the metrics are strategic; they support the goal of the ISC to track performance in such areas, but they only support a limited aspect of the strategic objective. This may be acceptable when there are other metrics supporting the other strategic objectives, but these metrics are not adequate on their own. Similarly, it is recognized that the scorecard metrics are important; people must have immunizations, etc., but they do not represent the top priorities of the enterprise (to provide quality logistical support and services to the CG). Therefore, while the scorecard metrics may be acceptable in conjunction with a number of other broader, enterprise-level metrics, they are not adequate for the ISC Boston enterprise.

c. **Mismatch between jobs and employee background/skills generates waste**: For various reasons, people may be assigned to do work that is not in their core expertise and/or not in their interests. For example, a number of operators are doing logistics in the Coast Guard. Doing jobs that are not their own or in their own interests takes away from the mission.

Organizational Structure and/or People: (Inefficient organizational structure, Opportunity costs of untapped talent, Lack of balance between functional silos and program and/or project organizations)

a. **Lack of synergy between all support functions causes waste:** The Coast Guard organization lacks clear responsibility and accountability for each job. On the surface, there are many departments offering overlapping services or that are willing to help to provide services. However, it is unclear which team or person should be ultimately accountable for the job. Without good metrics to validate job performance will only worsen the situation. When the customer complains, service and project deliver-date slips. This leads to the finger pointing game, where each department has its own assumptions, completes its jobs correctly, and blames others for the delay and poor service quality. These organizational issues in which responsibility is debated introduce waste.

b. **Lack of coordination through the different ISC components (silos):** Services and projects are likely to involve different ISC components, but it is unclear which ISC component should play the role of coordinator. Sometimes, an ISC component simply makes its assumptions and sits idle while waiting for resources. There can be deadlocks when multiple ISC components are involved. The ISC transfers information, resources, and materials depending on the service provided. They seem to do well in those areas that are measured by daily metrics. These areas are generally focused on the relationship between the ISC and the CG leadership. The interactions between the ISC and the operator are one-sided with no consistent metrics to monitor quality, and are therefore not doing well.

Key Issues and Areas for Improvement

There are many opportunities for improvement in the CG ISC enterprise. A way to identify areas for improvement is to recognize the things in the enterprise that do not work and which cause problems.

First, ISC is a "silo" organization. The different components of ISC are stove-piped, with little communication between the different organizations. As a result, there is little communication within the ISC, and even between the ISC and its customers, suppliers, and partners. Because of the lack of communication, work is often unnecessarily repeated. For example, two different organizations of ISC (ESU detachment and TISCOM) both spent a great deal of money developing a way to receive internet on the ships when they are docked. This work was done and paid for twice because the two organizations had not communicated with one another and did not know that the other was also working on the same problem. Horizontal integration across the ISC would therefore open the communication lines and make it a more productive and less wasteful organization.

Second, the processes are convoluted and non-standardized. This results in the operators being able to obtain logistics services from many different places. Often, the operators perform the logistics themselves with work-a-rounds to speed up the process. These work-a-rounds results in redundancies and extra work, leading to a lack of accountability. No one owns any particular process, and no one is held accountable for the outcome. This is a clear area for improvement, as more accountability and less redundancy would be good for the ISC. Additionally, the lack of standard processes leads to issues with responsiveness and timeliness, which is a major complaint among the operators. Standardizing processes, and having clear ownership of those processes, may lead to more responsive and on-time service, which would be of great use to the operators.

Next, the enterprise metrics do not support the strategic objectives. The identified strategic objectives are strong and support the mission of the CG and ISC. However, the metrics, particularly those that are actually tracked (through the ISC scorecard), do not support those objectives. For example, the biggest strategic objective is to provide quality, seamless logistics support to the CG operators; however, there are no metrics that relate to this goal. Some components of ISC have metrics (~1 per database), but those metrics are inconsistent, non-standardized, and not tracked by leadership or management. Furthermore, the incentives are not aligned with the strategic objectives, leading to little motivation to meet those strategic goals.

Next, there is a lack of configuration management, which is a desired strategic objective. The lack of communication and coordination, combined with the lack of standardized processes, results in many work-a-rounds. There is a desire for the operators to get the job done in any way possible. This conflicts with the desire for configuration management and standardized processes. This inconsistency must be resolved in order for those strategic objectives to be met.

These are a few of the major areas for improvement identified for the ISC thus far. Each of these areas involves many potential improvements, and could lead to a more effective and efficient ISC. Before we develop a transition plan, we delve into the dynamics of the organization with respect to change. As stated earlier, the best way to avoid unintended "side effects" is to look at the organization from a SD perspective so that all the effects of policy and organizational changes can be better predicted.

CHAPTER 5

The Coast Guard Change through a System Dynamics Lens

Most innovation scholars have emphasized the role of capabilities; others have focused on the role of cognition in explaining organizational inertia (Tushman, 2004). Managers or leaders often rely on simplified representations of the world in order to process information. These imperfect representations form the development of mental models and strategic beliefs that drive managerial decisions. They influence the manner in which managers frame problems, search for solutions and develop solutions (Tushman, 2004). As we know, all models are flawed. The question is, how much and does it matter? The model we attempt to develop here is not a perfect representation of all the dynamics that occur during an organizational change, but we believe that they are the dominant ones pertinent to a successful implementation.

Change is not as simple as figuring out where you are and where you want to be, following a few steps for change and reaching your goal. It is much more complicated than that. Many believe that culture is the answer, but units within the same company with the same culture can have widely varying levels of success for the same change program. Many argue that leadership is the key, but well-established leaders have tried to implement change in one company and succeeded in some and failed in others. Organizational structure is touted as another cause of success or failure, but units with the same structure and change program still have varying levels of success. I believe the answer is in realizing it is all of these factors, plus others; but more than that, it is the interaction of the factors and dynamics that they create that ultimately determines if the change program will or won't be successful.

Imagine going to the doctor because you are not feeling well. Before you've had a chance to describe your symptoms, the doctor writes out a prescription and says, "take two of these and call me next week." Of course, you would wonder how he could do such a thing before you have even told him what was wrong. If the doctor told you it worked on the last two patients, would that give you comfort? Consultants routinely prescribe such generic advice, and managers routinely accept such therapy with the naïve belief that if it worked for company A, it will work for us (Christensen & Raynor, 2003). We believe that the EVSMA describes the symptoms well, but even if we know the medication to take, how much and what is the best delivery system and how does it interact with other medications you are taking? These are also important concerns that can affect how well the medicine works. System Dynamics is a tool for evaluating all these factors and their interaction, so that we increase the probability of success by taking the medication we know we need in the most effective way.

Jay Forrester is considered the founder of system dynamics. Many of his students have capitalized on his teachings and changed the way business operates. Students such as Peter

Senge, author of *The Fifth Discipline,* Dennis and Donella Meadows, Jorgen Randers and William Behrens, who wrote *The Limits of Growth,* were also his apprentices (Fisher, n.d.). System dynamics has been incorporated into scenario planning, war gamming, lean production, supply chain management, global warming, urban renewal and many other disciplines as a method of understanding the complexities and realities of life.

In Forrester's first book, *Industrial Dynamics*, he shows that one of the consistent problems of most companies was not brought on by competitors or market trends, but was the direct result of their own policies. Using SD, people were able to see the long-term effects of their policies quickly and understand them. Once the links were revealed, companies could fix the problems by changing some small but consequential practices that happened to influence all the other factors of the system (Fisher, n.d.).

The Coast Guard is filled with great leaders at all levels and personnel that are driven to getting the job done. It is a challenge to document all the processes and procedures needed to get the job done for a new organizational structure before the structure is even implemented. At the same time, we cannot, as a policy, leave it up to the leaders in the field to figure out the details of getting whatever organizational change that is implemented to work. We propose from past experiences within the organization, that lessons learned from industry and data from lean enterprise analysis current state we can build a reasonable SD model of what happens when change is introduced into the organization. This model can then be used to make better policy decisions, improve the organization's ability to change and improve the organizations ability to implement long-term strategic programs.

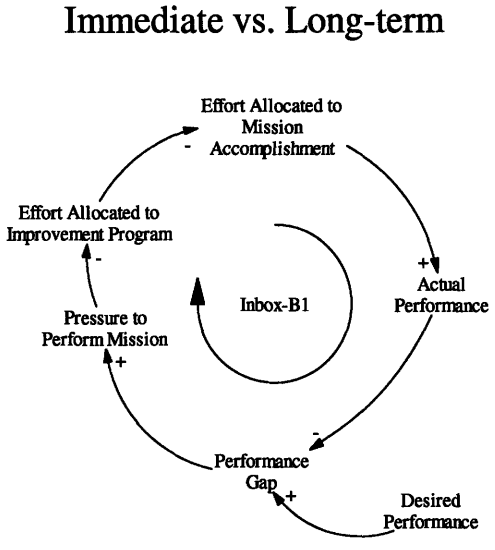

Figure 17-Inbox loop.

Our model begins with the basic concept that there is some desired performance that differs from the actual performance, which creates a performance gap. The bigger the performance gap is, the more pressure to perform the mission and close the gap. That means that, as pressure to perform the mission goes up, the effort allocated to improvement programs generally goes down. This is often called "Fire fighting". The inbox rarely leaves time for long-term strategic planning, long-term process improvement program or holistic thinking. The priority is to get the job done. So, as effort in long-term improvement goes down, effort allocated to mission accomplishment goes up. People work harder to get the job done; they put in the extra hours after work and on weekends. Of course, these extra hours pay off because performance goes up, and the gap goes down. This is a balancing loop, which seeks some equilibrium of performance based on resources.

From the comments of operators found during the LOAT survey (Logisitcs Organizational Alignment Team, 2007), the observations by Crea (1992), Mcallister (2004) and Phillips and Loy (2003), it is clear that getting the mission done is the overriding motivation of the majority of Coast Guard members (operators and logisticians) .

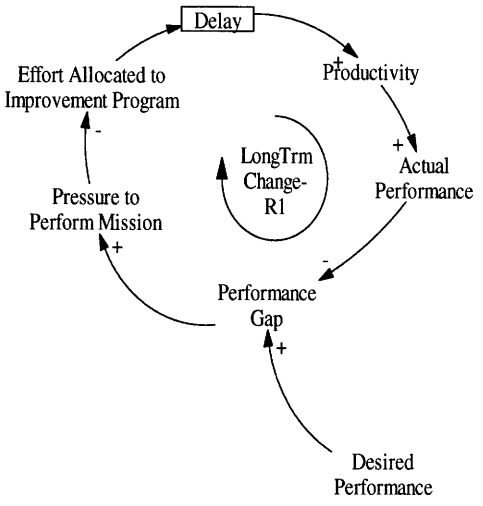

Figure 18-Long-term improvement.

This reinforcing loop starts at the same place. There is some desired performance that is different from actual performance, which creates a performance gap. The bigger the gap is, the more pressure there is to perform the mission. For the sake of argument, let's say that we decide

to invest in an improvement. That investment, if it is good, will lead to more productivity, which will increase actual performance. This will lower the performance gap, reducing the pressure to perform the mission. With reduced pressure to perform the mission, one can allocate more effort to improvement, thereby creating a reinforcing loop for the good.

Of course, there are some downsides to this loop. First, we are never sure if the improvement we plan will yield the productivity increase we hope. Second, there is a delay before the productivity increases, and in the interim, there is generally some loss of performance. Third, we are often not sure how long the delay will be a week, a year or several years.

This dynamic was found in business, in other government agencies and from our research in the Coast Guard (Crea, 1992) (Repenning & Sterman, 2001). A simple example is the change of an asset such as in the case of a small boat. Generally, the crews that drive the boat, the team that does the maintenance on the boat, and the logistics system that has supported the boat for several years have honed the system very well. When the asset is changed for a new and improved boat, there is a period in which the crew needs to re-qualify, and during that period, their performance degrades. It takes time to understand what the common casualties on a boat will be and refine the logistics train to respond quickly to those casualties. Therefore, on the maintenance side, the performance is also, at first, diminished. After some delay, performance does improve and, in all likelihood, is thereafter better for the organization.

When the two loops are put together, the complex dynamics begin to emerge.

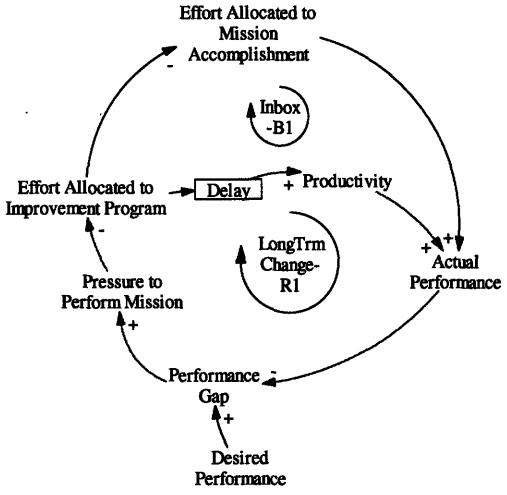

Figure 19-Daily battle.

In every organization, ideas emerge daily about new ways of doing things, new products, new applications for products, new approaches and processes (Tushman, 2004). Most proposals to innovate or change require human and financial resources. Observing, therefore, how resources are allocated to, and withheld from, competing proposals is instructive. I based the following diagrams on the LOAT survey responses, my personal experience, and several theses conducted by Coast Guard Sloan Fellows, as well as one-on-one interviews. I started with some basic loops and/or dynamics seen in business, as well as the Coast Guard, and began to build and add loops as the complex picture of reality became clearer. The dynamics of these two loops were summed up in a speech by Admiral Kime, on November 21, 1991, to the Federal Bureau of Investigation on Total Quality Management (Crea, 1992), in which he said:

> I have always looked at the way the Coast Guard operates perhaps as typified by Gresham's Law. Daily routine drives out long-range planning when an individual or organization is responsible for performing both highly programmed, time-sensitive, and reward filled tasks. The former will take precedence over the latter...I think the Coast Guard traditionally has done an A-plus, outstanding job on short-term things. On long-term things, whether they're continuing to implement existing programs, finding better ways to do things, or long-term acquisitions, we leave a little bit to be desired. I'm looking for total quality management to help that problem. (p49.)

In her thesis, Crea (1992) explains how, in informal conversations with top management, this idea was confirmed. "We do great studies but then don't implement them. We shift program emphasis from Commandant to Commandant." She further stated,"The biggest barrier to TQM is the competition for time with my real job...Just training people and getting everyone up to speed takes a lot of time" (Crea, 1992).

In McAllister's (2004) thesis, he states:

> Nearly all leaders I have interviewed were concerned about the short-term horizon created as a result of frequent job rotations. Strategic planning has been particularly difficult in the Coast Guard because the planning horizon may be significantly greater than any of the planner's tour lengths. As a new cadre of leaders takes over, the ownership of the plan diminishes, causing the wheel to be reinvented every few years.

The comment from Commandant to Commandant adds another dynamic to the model that we found is true, not only at the top, but throughout the organization. The time until the rotation of the change champion has significant impact on the other's commitment to the improvement program.

Many improvement programs within the Coast Guard have not yielded the success or benefits expected, and it is instructive to look at some of the dynamics at play in these cases. We started with the basic loops and slowly began to build to the diagram above. As mentioned earlier, in order to understand the complex dynamics that interact as part of any change process within the Coast Guard, we chose to utilize SD (Forrester, 1961). Similar dynamics are found in the corporate world (Keating, Oliva, Repenning, Rockart, & Sterman, 1999). The figure above describes the principle daily struggle between getting the "inbox" done, or spending time working on an improvement program. The pressures vary at different organizations within the enterprise, but the dynamics are the same. This struggle was clearly evident during the EVSMA analysis in the earlier chapter. The desire to get the mission done is the driving motivation for most operators.

Without understanding these dynamics, the successful implementation of any improvement program will be hard-pressed to succeed. This long-term versus immediate model is a beginning; we will attempt to expand this diagram to an appropriate boundary that describes, with just enough detail, the complex relations at play. This will hopefully guide future leaders in the organization to better success in implementing organizational improvement programs.

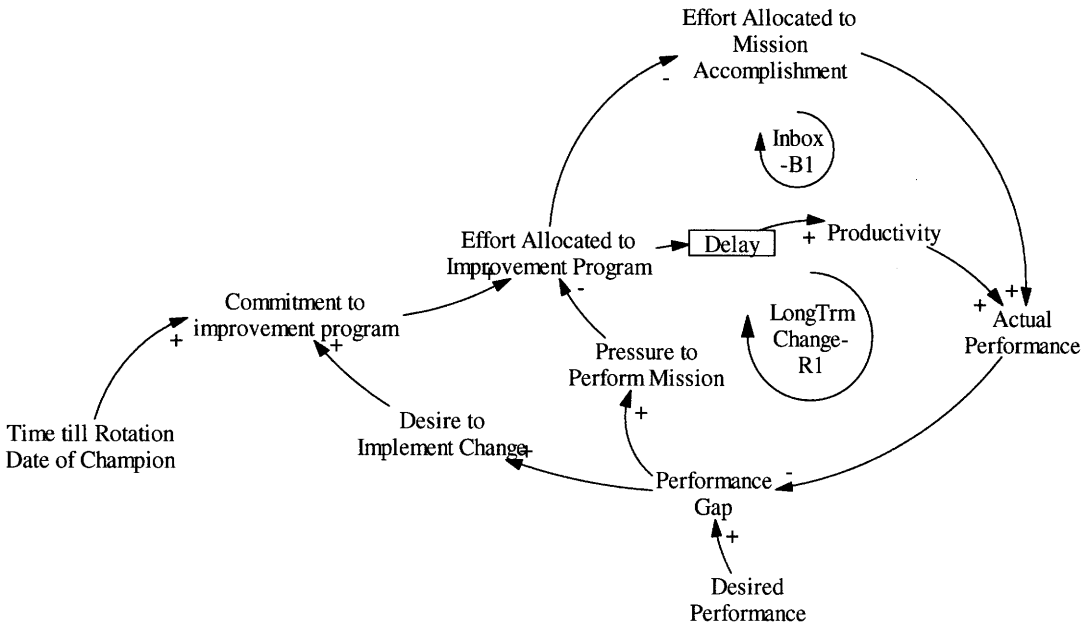

Figure 20- Long-Term vs In-Box

There are two loops described in Figure 20 which represent a self-reinforcing loop for long-term change that can drive toward positive or negative results, as well as a balancing loop for the inbox which is a constant pressure and drives toward some equilibrium of performance. In our analysis of the interaction of these loops, let's start at the impetus of change. There is some desired performance, and there is some current performance. This performance gap creates two dynamics: pressure to perform the mission or "get the job done", and a desire to implement change that will make it easier to "get the job done".

As mentioned, the time to rotation was added to the model as a powerful influence on member's commitment to change. As not only leaders in the organization, but the majority of the personnel, rotate regularly, any commitment to any improvement is affected by how close the champion of the change proposal is to rotating. If the person has only just reported aboard for a

4-year tour, the commitment is often stronger than if the person has only 6 months left. So the smaller the time to rotation, the less the commitment from others, all else being equal. This "lame duck" syndrome is seen both in corporate and government. Everyone knows that the new person coming in will just want to implement some new change, so people are reluctant to expend a great amount of energy on the incumbent.

Now we refer to the loops. We see that increases in pressure to perform the mission decreases the effort allocated to improvement programs. This has been seen time and time again. I have heard the following, exact quote while attending a conference where the discussion point was the change from Coast Guard groups to sectors, and another while attempting to implement some changes of my own when I served as commanding officer: "I don't have time to complete this survey of the functions we perform; we are too busy performing them." This same dynamic was clear at the outset of the LOAT surveys, but because the methodology was so interactive and time was allocated from the work day specifically for the surveys, most respondents supported the effort.

If effort is allocated to the improvement program, it comes at the expense of the effort allocated to mission accomplishment. This reduction in effort causes an initial decline in actual performance. Suffice to say that the decline in performance can last anywhere from a day to several years, depending on many factors. A study of program improvement at Du Pont showed an increase in costs for preventive maintenance (a decline in performance) that lasted nearly 2 years before the improvement or cost savings began to appear, but once they did, they grew nearly exponentially, demonstrating that the investment was well worth the wait (Keating, Oliva, Repenning, Rockart, & Sterman, 1999). Many leaders within the CG are not willing to acknowledge this, or take appropriate action to correct this, while still expending energy on improvement; thus, many programs die on the vine or never fully get implemented.

A widely recognized "reinvention" in the U.S federal government was thanks to Joe Thompson and his successful conversion from a vertically "stove-piped" organization to one that used self-managed, multi-functional teams to improve service of Veterans Affairs Customers in New York. Of note, the VA's efforts at change nearly folded under the political pressure the agency received when its short-term performance dropped as a result of radical change effort. After they received Vice President Gore's Hammer Award in recognition of their reinvention program, the award was immediately subjected to congressional audit (McAllister, 2004). It passed with flying colors, but the point is clear: The pressure for short-term performance is strong and comes from many circles.

As mentioned earlier, the R1 loop can act as both a positive or negative force. In the positive sense, if the delay is recognized, productivity will eventually increase, leading to an actual performance increase with much less effort. If continued investment in improvement is not realized, then productivity will continue to go down. This reduces actual performance,

creating more pressure to work on the "inbox" and less time to work on improvement. This is how organizations get into the constant firefighting syndrome. From the comments collected during the LOAT survey, it would appear that Coast Guard operators are very much in the "inbox" loop.

There is a balance that leaders must find. In the Aftermath of the terrorist attacks on September 11, 2001, eight new maritime safety and security teams were created. These highly mobile, highly trained teams were designed to augment existing Coast Guard forces in the port environment when the threat level increased. McAllister (2004) notes that, based on interviews and observations, "The strong emphasis on getting these teams equipped and trained had a cost that came in the form of slowing the delivery of training, equipment and personnel to existing Coast Guard stations that were already stretching resources to meet homeland security missions' needs"

Employee Commitment

Push or Pull

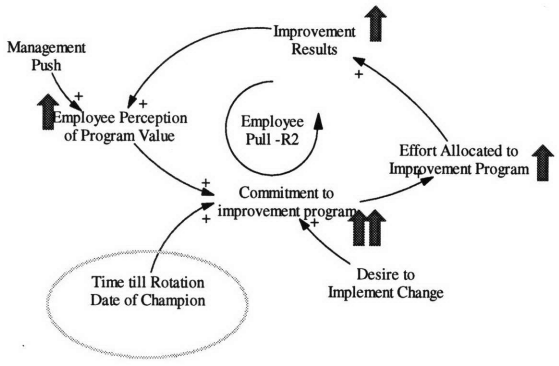

Figure 21-Push/Pull.

One way of getting change implemented is through hierarchical authority, which for the sake of argument, is different than leadership. Everyone who works in an organization has seen the exercise of hierarchical authority. Those who are at higher levels have the power to hire, fire, measure and reward behavior, and provide direction to those under their purview. While

hierarchical authority is seen as legitimate and is a part of life within an organization, there are nevertheless several problems with using this method as a way of getting things done. First, managers can't be everywhere and people are more and more independent in their actions the farther they are from the authority figure. Second, almost every change involves cooperation with someone not in our direct chain of command. Third, what if the person at the apex is wrong and hierarchical authority was the only reason everyone did what was told (Tushman, 2004)?

A perfect example of this in the business realm was what happened to E.F. Hutton when Robert Fomon, the chief executive officer, ruled the firm through a rigid hierarchy of centralized power. No one in the firm challenged him to see the new realities that Hutton and other security firms faced in the 1980s, and consequently, when the brokerage industry changed, Hutton eventually ceased to exist as an independent entity (Tushman, 2004).

In their 1990 study of six large business firms that were going through revitalization efforts, Beer, Eisenstat and Spector found that each company's success or failure was largely a result of whether they followed a top-down or bottom-up approach. They argue that, although top-down strategies are acceptable in more stable times, the modern, dynamic business environment requires far greater innovation and collaboration, making bottom-up strategies more successful (McAllister, 2004).

In Figure 21, the management push is denoted, as well as the time until rotation date of the champion because they both have an effect. The most powerful effect, however, is the reinforcing endogenous loop of employee pull. If the commitment to the improvement program goes up, the effort allocated goes up, and if the effort goes up, so do the results. If the results go up, then the employee perception of the program goes up, and that increases the commitment. The question is, how do we get and keep this loop working for the positive? If commitment goes down, so does effort, results and program value.

Virtually every managerial and leadership doctrine today states that: in order to succeed with an organizational improvement plan, you have to get employee buy-in and commitment. The employee has to want the change. This can start as a push, as most change does in the Coast Guard. Push is when the management sells the need to change, as well as the change program through speeches, recognition, metrics, evaluation pressure, etc. Employee commitment is affected by many factors. The loop described above in Figure 21, the Employee Pull loop, is also a recognized phenomenon in the commercial world (Keating, Oliva, Repenning, Rockart, & Sterman, 1999). The Employee Pull reinforcing loop, R2, can work as a motivator for positive change or as a de-motivator to stop change. When commitment to the improvement program increases, the effort allocated to the program goes up. This leads to an increase in improvement results, which increases the employee's perception of the program value, and their commitment goes up accordingly. In the negative, if the employees do not see any value in the program, their commitment goes down. This leads to less effort and less improvement results, which decreases

their perception of the programs value even more. This is exactly the dynamic mentioned in Crea's (1992) theses on TQM implementation.

Keeping this loop reinforcing for the positive is what "low hanging fruit" is supposed to facilitate. Also, the "sense of urgency" often mentioned as a prerequisite for change is a method of getting this loop to work in the positive. The policies, rewards and implantation plan should seek to get the employee to want to change, to commit to the improvement program and monitor this loop throughout the process. This loop fits into the model as shown below. Many of the successful changes in the Coast Guard have been the direct result of a loss of life or some other extreme circumstance that created a pull from the employees to want to change.

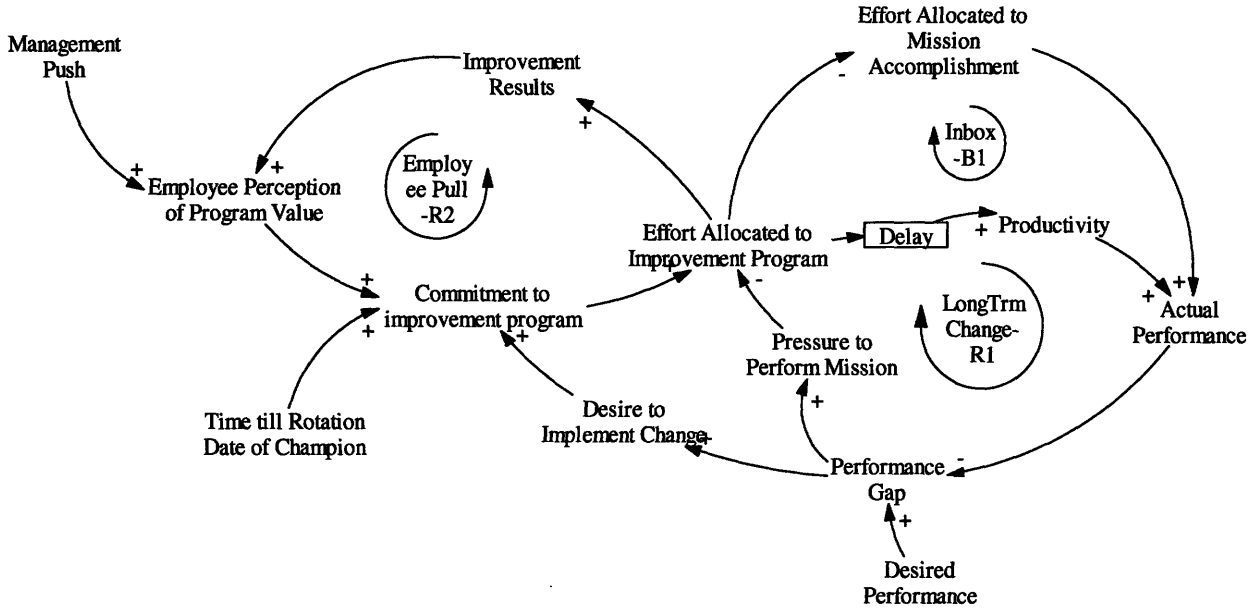

Figure 22-Employee commitment.

There are many other forces that affect improvement results, employee perception of value and all these factors. This powerful reinforcing loop should be clearly understood so it can be taken advantage of if we want to be successful.

These loops combined are the primary deck-plate level drivers. They are the motivations that each leader and manager deals with on a daily basis. How the policies affect these loops on a personal level can determine the effectiveness of the implementation program.

We have seen change implementations when the management has pushed an idea, but their rotation date was short. If the employee pull is negative reinforcing, we get the "wait it out syndrome" that is often seen in business as well as the Coast Guard.

Training, Support and Documentation

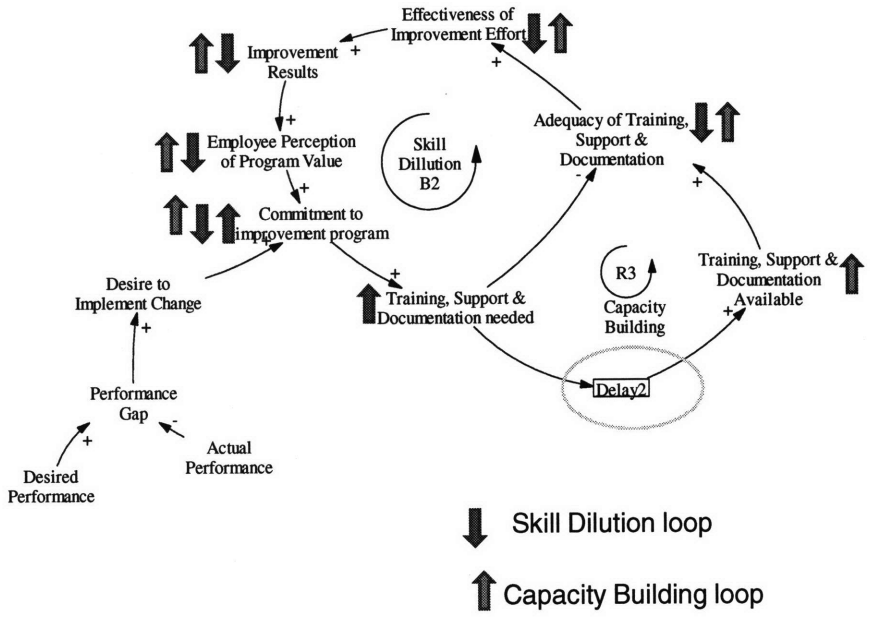

Figure 23-On the job training.

From the comments received during the LOAT study and a review of Coast Guard change historically, it is clear that the organization will often move boxes and then implement training. There are a couple of things that happen when we do this. Many organizational changes require that we learn and implement new processes, procedures and often even new skill sets. In Figure 23, we see that, as commitment to an improvement program goes up, the training needed goes up. Therefore, the adequacy of the current training goes down, which brings down the effectiveness of the improvement and, thereby, the results. Lower results causes lower employee perceptions of program value, which lowers commitment. This is the balancing loop that seeks some equilibrium level of commitment relative to the level of training, documentation and support provided.

Our dependence on "on the job training" (OJT) is a great example of how this works. Since the majority of training within the CG is "on the job training", the processes, procedures, contacts and documentation for almost every function differs by geographical area, unit, boss, etc. More often than not, the CG implements organizational change starting by moving boxes or billets around, and then, once the new structures are in place, they look to create the documentation and training needed to implement the new structure well. The most recent example of this is the change to Sectors, which combined operational shore units known as Groups with Marine Safety Offices. There is no doubt that the synergies gained by the combination can be of great value, but the organization is still attempting to work out how this new structure will function 2 years later.

If OJT is the primary source of learning and the new structure has no new defined processes, many members will rely on their previous knowledge, previous processes and previous points of contact to get the job done. As new people come in, they will be taught the same old processes and, therefore, the new benefits never emerge.

The delay is something that the organization can control. Minimizing the delay can cause the adequacy of training to go up, which makes everything improve by the reinforcing loop, "Capacity Building", seen in Figure 24. The longer the delay, the less effective, and the greater the risk of failure for the improvement program.

More complex than just "make it happen"

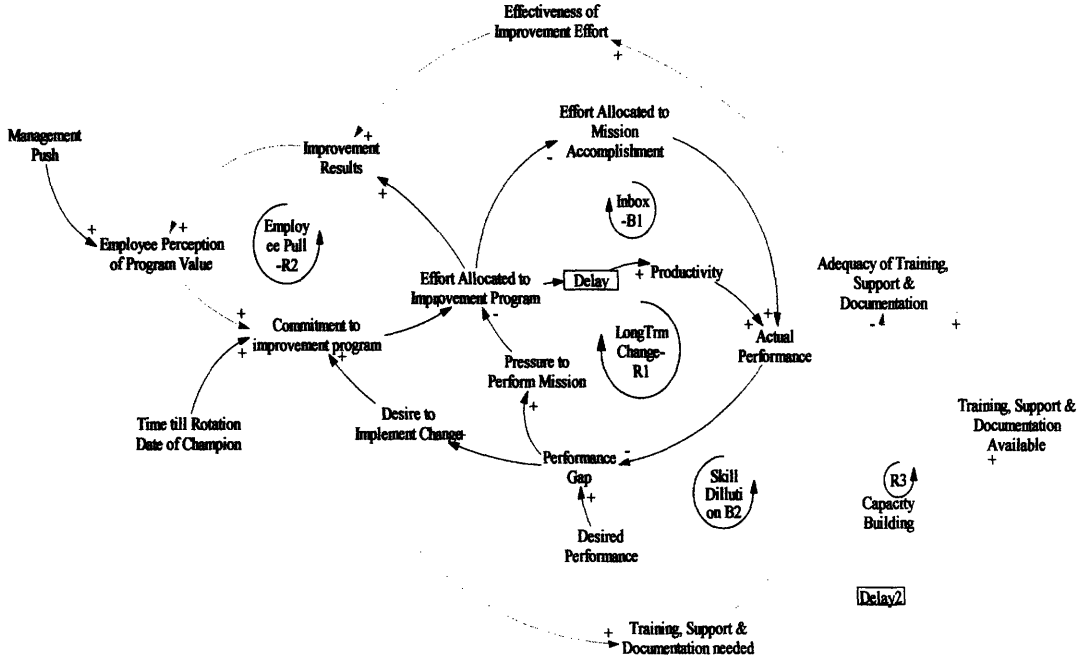

Figure 24-Training

During the early 2000's, the Coast Guard adopted many "labor saving" software programs that put the maintenance of personnel records in the hands of field unit supervisors (McAllister, 2004). This was paid for by reducing the number of Yeomen, the rating of Coast Guard members that normally provide human resource services. Suddenly, the field unit supervisors and individuals had a lot more work, very little training and, from their perspective, received no real value from this change. Eventually, the Commandant put a moratorium on any information technology related changes until more study could be done on the impacts to field units (McAllister, 2004).

According to the 2002 Coast Guard Organizational Assesement Survey (OAS), 61% of Coast Guard members agreed that members receive the training they need to perform their jobs. Only 49% agreed with the statement that members are provided with training when new technologies are introduced. Nearly one-third of the Coast Guard disagreed with the statement that the amount of work is reasonable, allowing members to provide high-quality products and services (McAllister, 2004).

The additional loops of Skill Dilution and Capacity Building added in Figure 24 have also been found in the corporate world (Keating, Oliva, Repenning, Rockart, & Sterman, 1999). These areas are powerful dynamics that the CG has often either neglected or not given the emphasis to needed for a successful implementation.

The existing implementation dynamics are already getting quite complex and that some of it is out of the purview of the local leader. There are admittedly great leaders out in the field, but they are all different, with different and varying skills. If an implementation program is not viewed and planned for holistically, then the only result is varying degrees of adoption in different locations, which can cause an overall plan to fail. When assessing how this fits into the bigger model and realizing, at the deck plate level, that most managers are fighting their "inbox", this delay, if left up to some, can be a very lengthy.

Leadership Coalition

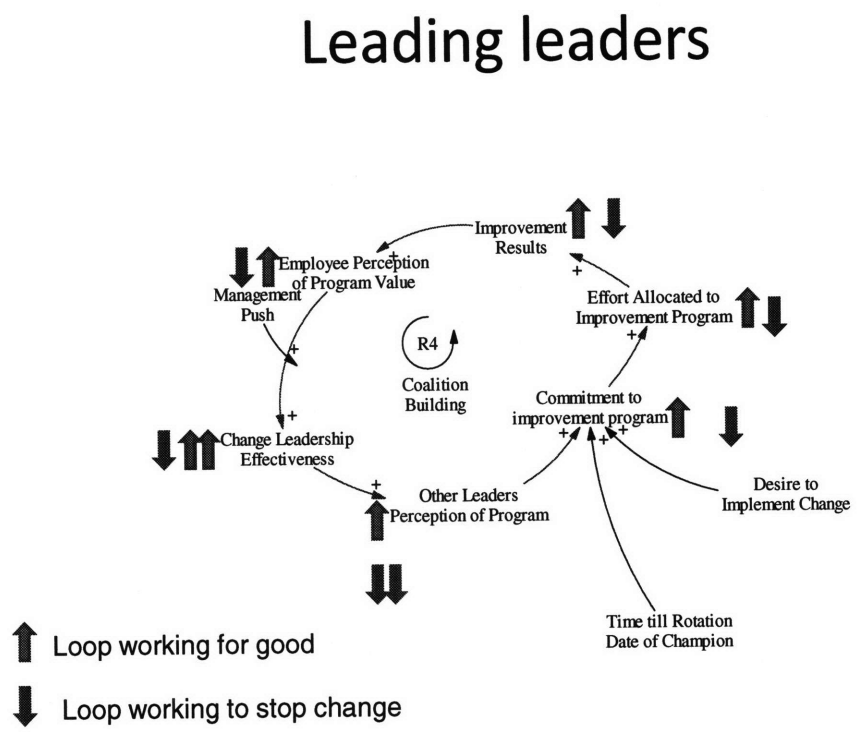

Figure 25-Leading leadership.

Any organization is a political system made up of various individuals, groups and coalitions competing for political power (Tushman, 2004). In the transisiton state, these dynamics may become more powerful as the old strucure, with its political implications, is dismantled and a new design takes its place. Significant change poses the possibility of upsetting or modifying the balance of power among various formal and informal interest groups. The uncertainty created by change creates ambiguity, which in turn tends to increase the probability of political activity as people try to create some certainty (Tushman, 2004). Individuals or groups may take action based on how the change will affect their relative power position in the organization. Individuals may also act because they do or do not agree with the ideaology of the change. Either way, other leaders, both informal and formal, have a powerful effect on the success of a change program.

Politics are not always internal. McAllister (2004) noted that external political support for change can come and go, not only with rapidly shifting political appointments and Congressional

postitions, but also with a change in public support. Often, political capital must be expended to faciliate change, and this involves risk. If a program is succesful, politicians share the glory, but if it fails or mistakes are made, the temptation for elected officals to exploit the situation for criticism is substantial (McAllister, 2004). The National Academy of Public Administration found that the American political culture has demonstrated an increasing intolerance with any missteps in government. This dynamic, I believe, is mirrored inside the organization.

From Figure 25, we can see that if other leaders buy into the change, commitment goes up. It should also be noted that time to rotation is another input to this variable. As commitment to the improvement program goes up, effort allocated goes up, which improves results. As results improve, the employee perception of the program goes up, which makes the change leadership effectiveness improve. Of course, since this is a reinforcing loop, if the other leaders do not buy in, everthing goes down and change leadership effectiveness gets much harder.

Leadership is not always position power. Often, informal leaders and "gatekeepers" have tremendous sway on other members' acceptance of a program. In the Coast Guard, these informal leaders can be senior civilian staff whose rotation dates are much longer than military personnel, and whose experience and expertise have earned widespread respect in the organization. They can also be the senior enlisted ranks.

According to Crea (1992), during the implementaiton of TQM, many senior personnel who had not received any of the training viewed the program with cynicism, stating, "Here comes another one, just like the rest: planning programming budget system, zero-based budgeting, management by objectives, etc" while others remarked, "Many of the admirals and senior are just saying wait it out". This lack of support by other leaders in the organization, based on either perception or politics, can bring the implementation of a program to a halt.

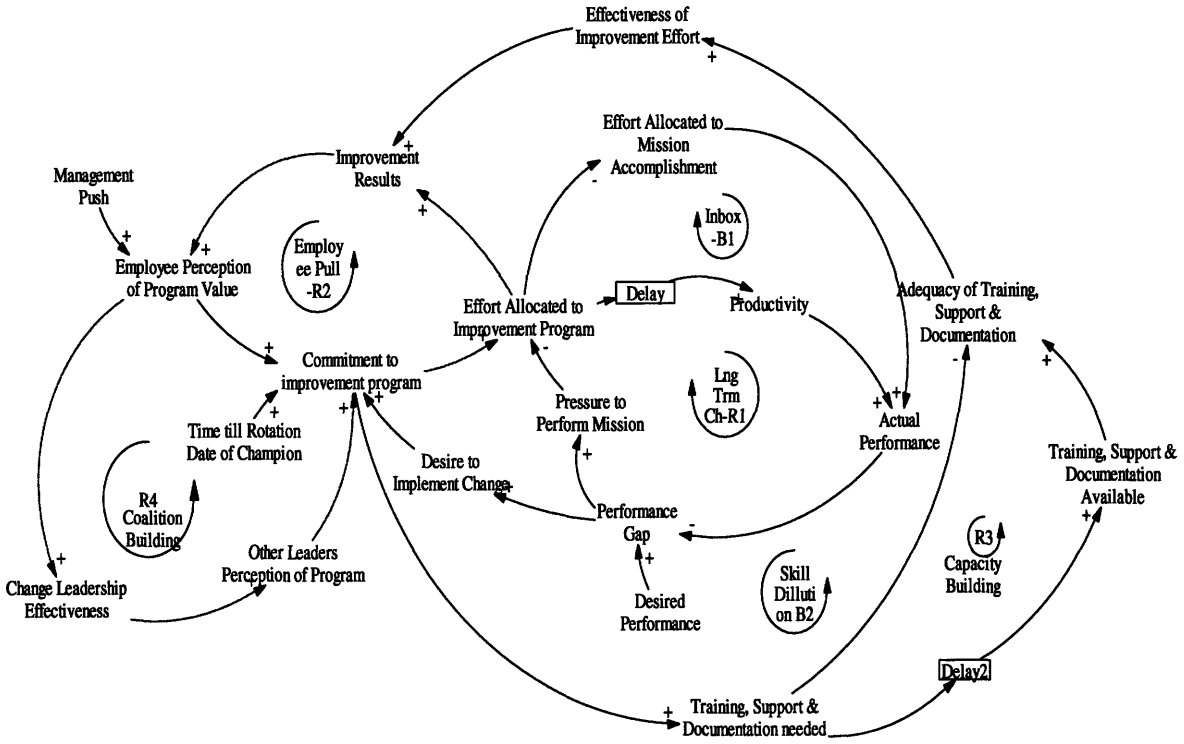

Figure 26-Leadership coalition.

In an organization known for its strong leadership at every level, this is critical to the success of any change. In the Coast Guard, as in most organizations, there exists a structured, formal hierarchy and an informal social network. Data from research has shown that the ability of the informal social networks to effectively bring about change is much more effective than the hierarchical one. Informal leaders in the social network of experts, information gatekeepers and mentors are often an underutilized asset when trying to implement change. Chief warrant officers and senior civilians can often hold more influence when it comes to change implementation than can an admiral who will only be in his position for one year.

Personal Value

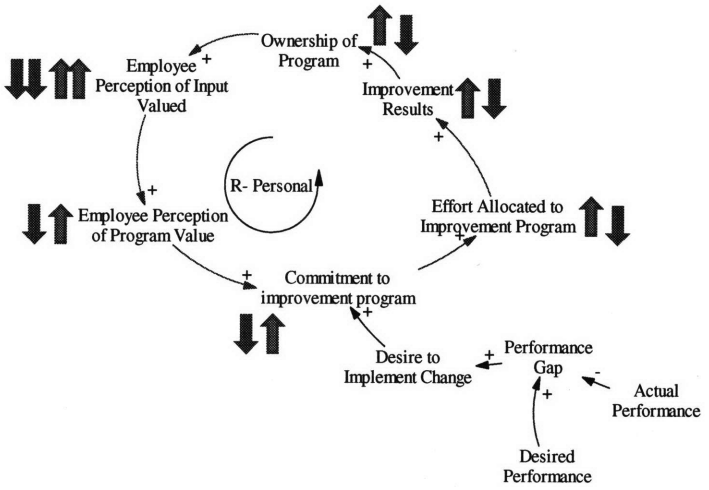

Figure 27-Value perception.

This personal loop came about for two distinct reasons. The first is that the best innovations or ideas for improving a process or product come from users who do the process or use the product every day. Eric Von Hippel (2005) in his book, *Democratizing Innovation*, showed that user innovations greatly outnumber manufacturer innovations for new functionality and capability in almost every industry. Lean manufacturing is built on this same principle. The Coast Guard sees this every day with "chief alterations", a discouraged practice that is often incredibly innovative. This is one of the cornerstones of the Innovation Expo, in which the Coast Guard participates in every year, giving units an opportunity to present their ideas on improvements. The Coast Guard obviously recognizes the incredible amount of talent in this workforce; the question is, do they take advantage of this resource while developing the change initiative?

The second reason for the loop is that when a person feels that their input has been valued, even if it has not been used, their perception of the program's value goes up. This leads to a positive reinforcing loop. Of course, when a person feels that their input has not been valued,

even if the program is good, their commitment goes down, which will also be reinforced and bring everything down.

McAllister (2004) notes in his thesis an interview with an exceptional station commanding officer who, when asked how to empower its young people to implement change, responded, "Ownership is the key...if people feel that they are valuable part of the process, they will personally contribute to any effort that makes the process better" .

This station commanding officer received recognition for being in the top 10% of Coast Guard stations nationwide (McAllister, 2004).

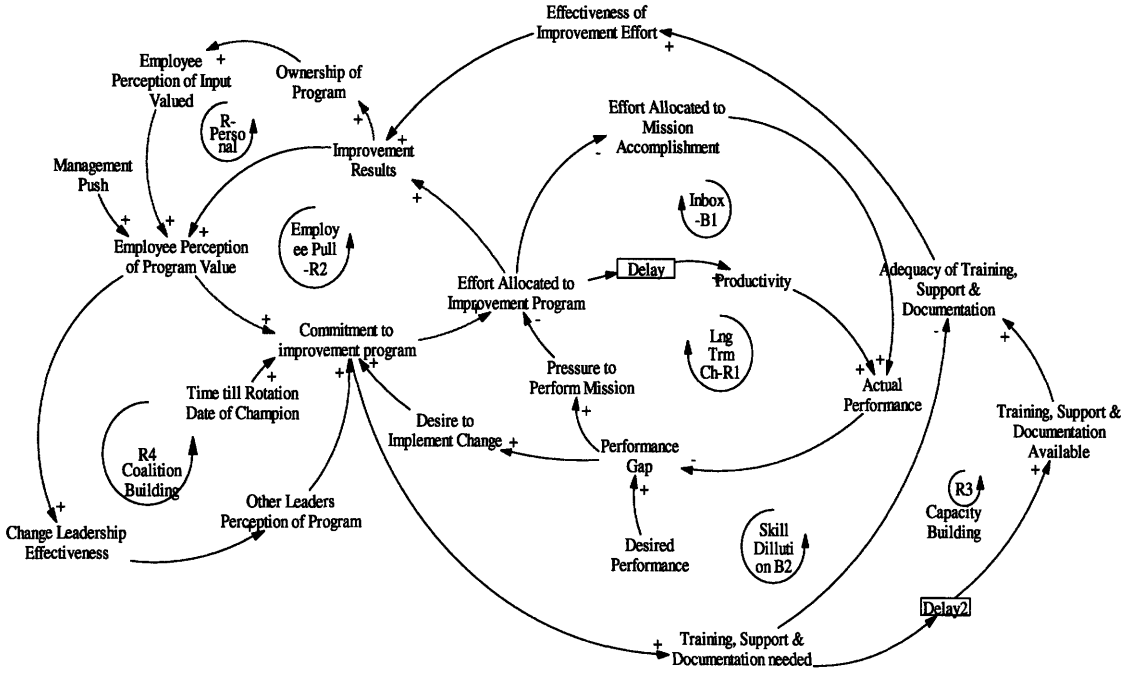

Figure 28-Personal value loop.

There are many positive attributes to valuing the input of employees. Having ten or twelve people in a room thinking about the best way to bring about the change needed is the standard practice. Given today's technology, the entire Coast Guard can be engaged in this process. Transparency in the process will make every member feel valued; personal ownership can push this loop and others into the positive. Some may believe that organizational structure is too complicated to be distributed to the masses, but we would argue that if RedHat can develop software on par, and most would say, better than Microsoft's, with thousands of volunteers contributing their ideas, than the possibility of solving organizational problems with input from volunteers may also be possible. Threadless designs an entire new line of shirts every 2 weeks with two or three designers on staff, mainly using input from volunteers. Many companies have broken down their most daunting challenges into discreet modular parts and farmed them out as part of contests to the masses.

Users are powerful resources that should not be ignored. If the solution space is large, but the space for a viable solution is small, your chances of finding the viable answer improves with the more solutions within the space you review. Therefore, a question posed to ten intelligent people will generate some possible solutions, but the same questions posed to 10,000 people will generate even more. The answers generated by the 10,000 can also be self-selecting or narrowed down by this same group given the tools available today.

User input can produce quality ideas and create a positive reinforcing dynamic when that input is perceived to be valued. This is something that should be considered when planning to implement organizational change.

Work-a-rounds

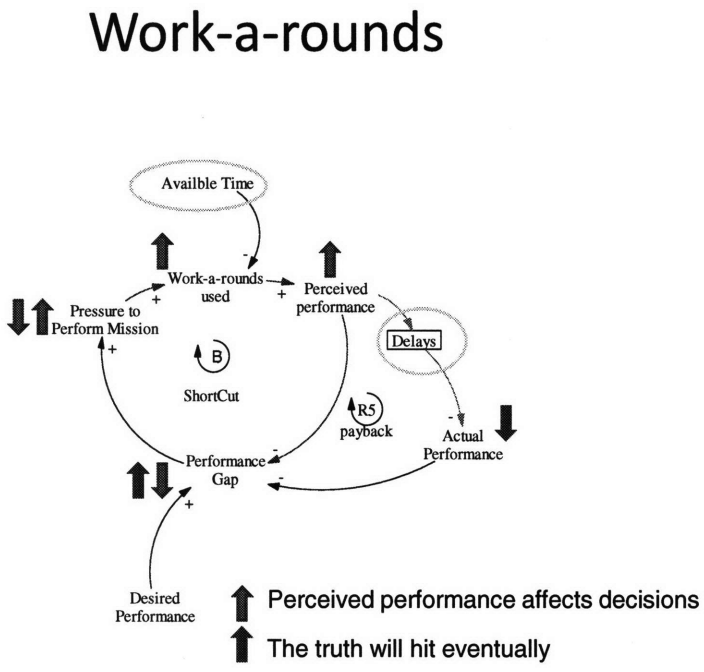

Figure 29-Work-a-rounds.

From the surveys conducted during the Logistics Organizational Alignment Team (LOAT), research and personal observation, it appears that work-a-rounds abound in the Coast Guard. People want to do the right thing. It seems that the availability of time is a major factor in determining if someone will go ahead with a work–a-round instead of the accepted process. If they do not have the time, Coast Guard members will develop short-cuts or work-a-rounds. This leads to a perceived performance increase, which may lead to a perceived closure of the

performance gap. In reality, there is usually some delay before the effects of the work-a-rounds are evident. Delayed maintenance is the classic example seen every day in the Coast Guard.

An example offered to me during a one-on-one interview is instructive to review. A patrol boat had a pump casualty, and the process to get a new pump from the logistics system was longer than the engineer wanted to wait, so he procured a pump locally. As it turned out, the pump that failed had a problem and consequently failed in other patrol boats. Because the patrol boat community is so small, the word quickly got around that a certain new pump that could be found locally was a nice replacement. Unfortunately, the unit within the logistics system responsible for storing the pumps never received any casualties because the pumps were being replaced locally. They therefore procured more of the faulty pumps, believing they had a high mean time to failure, since they never seemed to have casualties.

The insidiousness of the work-a-round loop is twofold. Because the delay often occurs long after the person leaves, the association of the work-a-round act and cost are rarely put together. The organization seems to have a strong culture to "get the job done". It rewards and promotes those that do. These people have often used work-a-rounds and become local heroes, which creates an environment in which those that see the benefit of the work-a-round move up the ladder and continue to reward and promote others like them. The LOAT survey made clear that members who come up with these work-a-rounds are often heroes and, therefore, this decision pattern becomes the chosen path for those that are excelling.

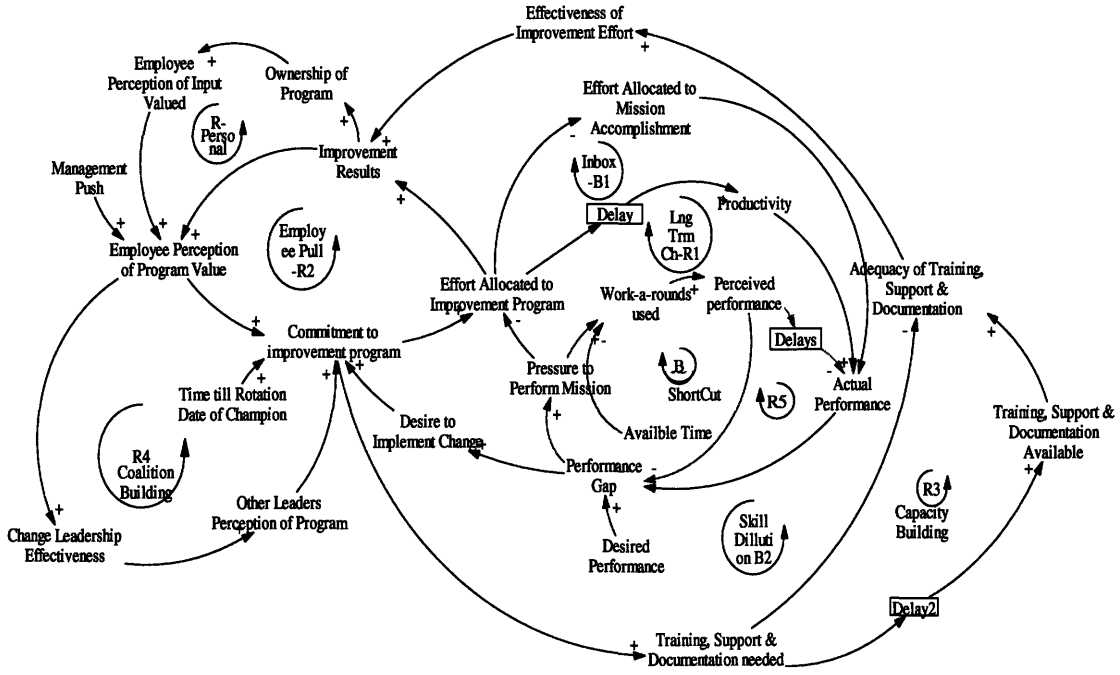

Figure 30- Greater impact of Work-a-rounds

Work-a-rounds are bad for the organization not only because of the perception they create of closing the performance gap, but because they also detract from the improvement effort, which hurts in the long-term. Since the availability of time seems to be a deciding factor, a closer look at this variable is in order. If we desire to increase the availability of time, we can make the process that is being cut short faster, increase staffing or decrease the pressure to get work done. This dynamic is a powerful force that is demonstrated in industry and the Coast Guard every day and should be a consideration when making policy decisions.

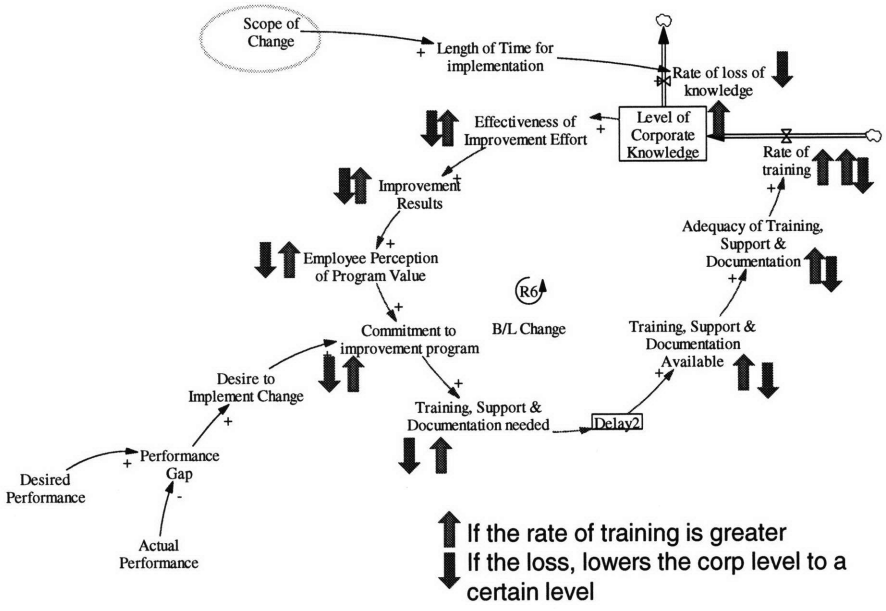

Figure 31-Corporate knowledge levels.

In order to implement any successful change, you need to have some level of knowledge throughout the enterprise of how, why and the details. That level of corporate knowledge is displayed in Figure 31 as a Stock. This Stock has an inflow, the rate of training and an outflow, the loss rate of knowledge. The rate that knowledge is lost varies depending on how training is conducted, rotations, use of knowledge, retirements, etc. The larger the scope of the change, the longer it takes to implement. If we determine that a certain level of corporate knowledge is needed in order for an organizational change to be effective and that level is maintained, the reinforcing loop keeps everything positive. If the corporate level drops below what is needed, the reinforcing loop turns negative, fighting against the change.

The CG, as well as most organizations, have historically underestimated the length of time needed to effectively implement large-scale change. A lesson learned from the TQM implementation in the 1990s: The CG had a large ramp up of training and the level of knowledge was about right as they began implementing the program. The training stopped after 2 years and loss of knowledge continued, through rotations (when people would not use a skill, or retirements, etc). Eventually, no one was around who was experienced and in the right place to implement it. This was one of the reasons it never took off and the continual improvement espoused by Total Quality Management seemed to dry up on the vine (Crea, 1992).

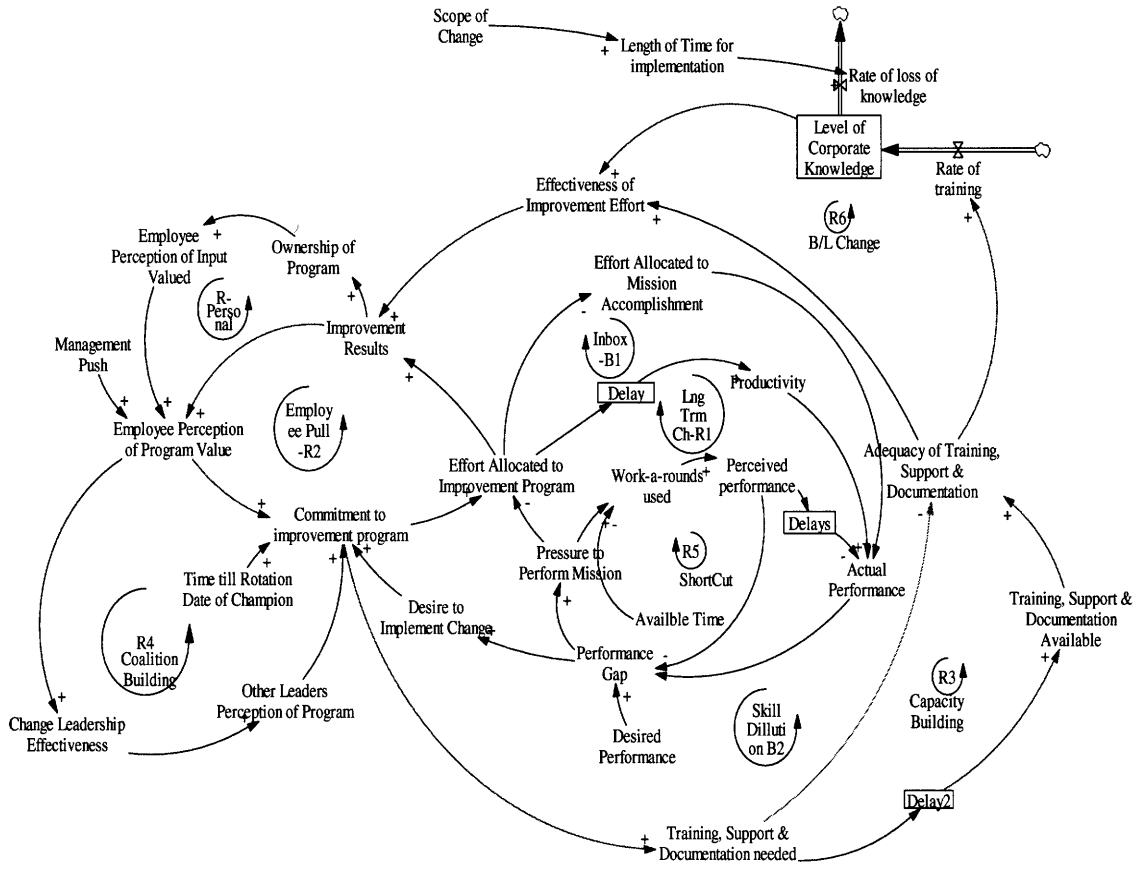

Figure 32-Big/Little changes loop.

The bigger the change, the longer it takes to implement. There is plenty of empirical evidence to support this hypothesis in both business and government. The longer it takes to implement change, the more time for a loss of knowledge about that change, why it is being done, what all the phases are, why certain decisions were made, etc. As the level of corporate knowledge goes up or down, so does the effectiveness of the improvement effort. In Keating, Oliva, Repenning, Rockart and Sterman (1999), the authors adapt Schneiderman's 1991 study on improvement half-life and show that, as the complexity grows both organizationally and technically, so does the time it takes to change. For instance, a single department within a unit making a simple technical change like a process improvement may take 6 months or less. Enterprise-wide changes of a complex nature (including processes, information technology infrastructure, etc.) will take 60 months or more. Viewing this in light of the entire model adds another consideration to policy decisions, if success is the ultimate goal.

Although this corporate knowledge level loop is strictly focused on the Coast Guard personnel, this is also true for other stakeholders, like Congress. The longer a change takes, the more chances that the Congressional committee members will change out and, thus, the education of what, why and how needs to be re-engaged.

There are two important points to be made here. One is that training needs to be set in a fashion that keeps the level of knowledge where it is needed to be successful. The other is that the scope of the change often takes longer than leaders think.

Sustainability

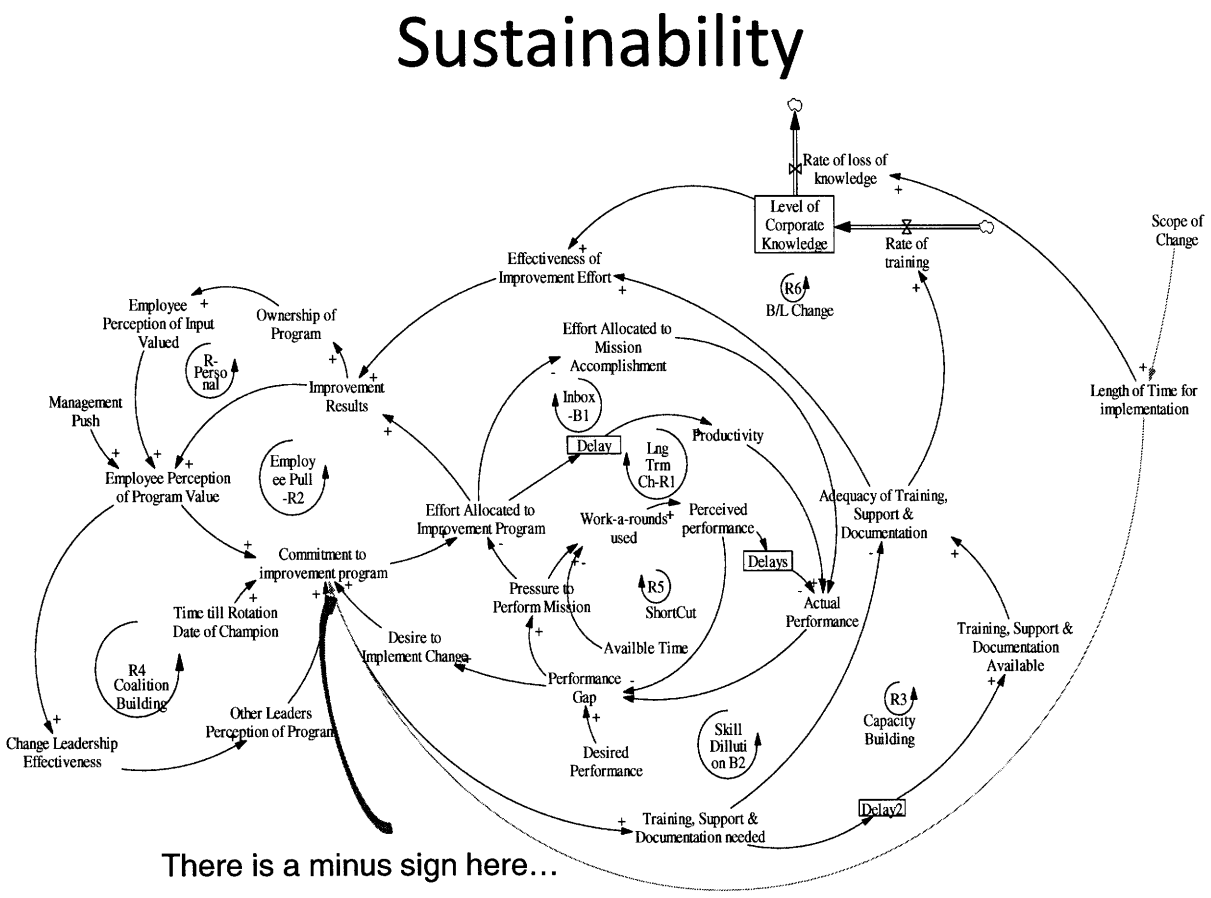

Figure 33-Sustainability.

This is a simple addition, but a pertinent force, that needs to be considered. As the scope and complexity grow, the time to implementation also grows. The longer it takes to implement a program, the less the commitment to the program. With regard to policy decisions, realizing this

may cause planners to break a large, complex program change into smaller phases to make it easier to retain the commitment in the shorter period.

Proximity

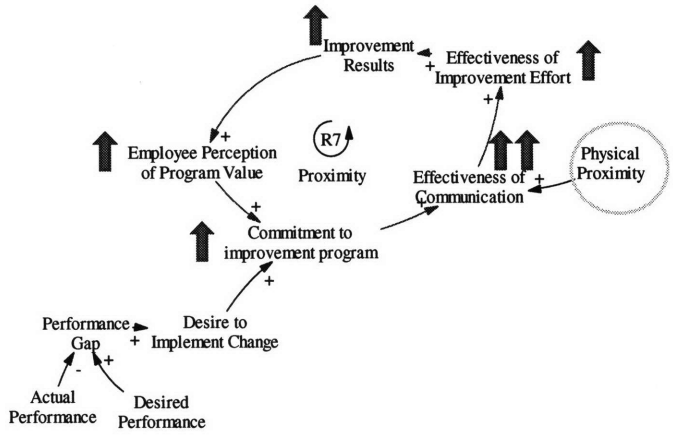

Figure 34-Proximity.

Figure 35 affirms that physical proximity increases communication, which increases the effectiveness of the improvement program. This, in turn, increases improvement results, which raises employee perception of the program value, thereby raising commitment to the program. This is a reinforcing loop that works in both the positive and negative.

Many people believe that, with the advent of virtual space and email, proximity does not matter. Based on research by Thomas Allen and Ralph Katz, it has been shown that the probability of communication is related to distance (Katz, 2004, P.298-325). The more distance there is between two parties, the less likely it is that they will communicate. The graph in Figure 35 below is a chart of the probability of weekly communication relative to separation distance. This data was based on many studies in several companies in the Unites States and Europe.

Allen's research also showed that people will call and email other people that they see on a regular basis more often than they do those farther away that they do not see regularly.

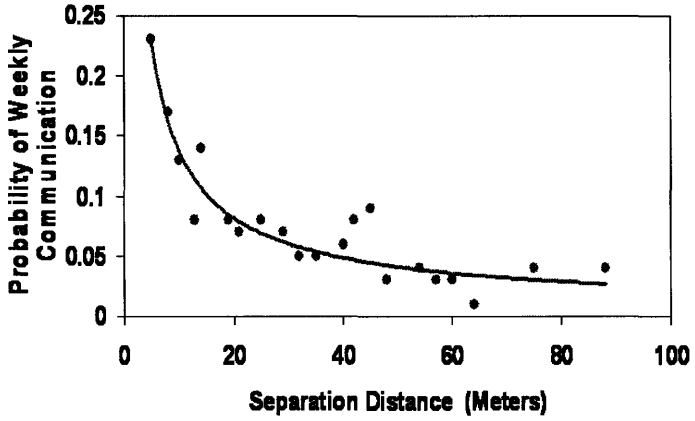

*Figure 35*Communication vs Proximity (Katz, 2004 p305)

In the Coast Guard, the stark differences between the Atlantic Area and Pacific Area commands with respect to how and when they implement policy changes by Coast Guard Headquarters is a good example of this phenomenon. Communication has a large, non-verbal portion. Expressing complex ideas is much more difficult over the telephone or in writing. Studies have shown that face-to-face communication is more effective the more complex the ideas, and organizational change, as we have shown, is very complex. Policies, interconnections, and all the details associated with change, make proximity a powerful dynamic force that should be considered when making decisions.

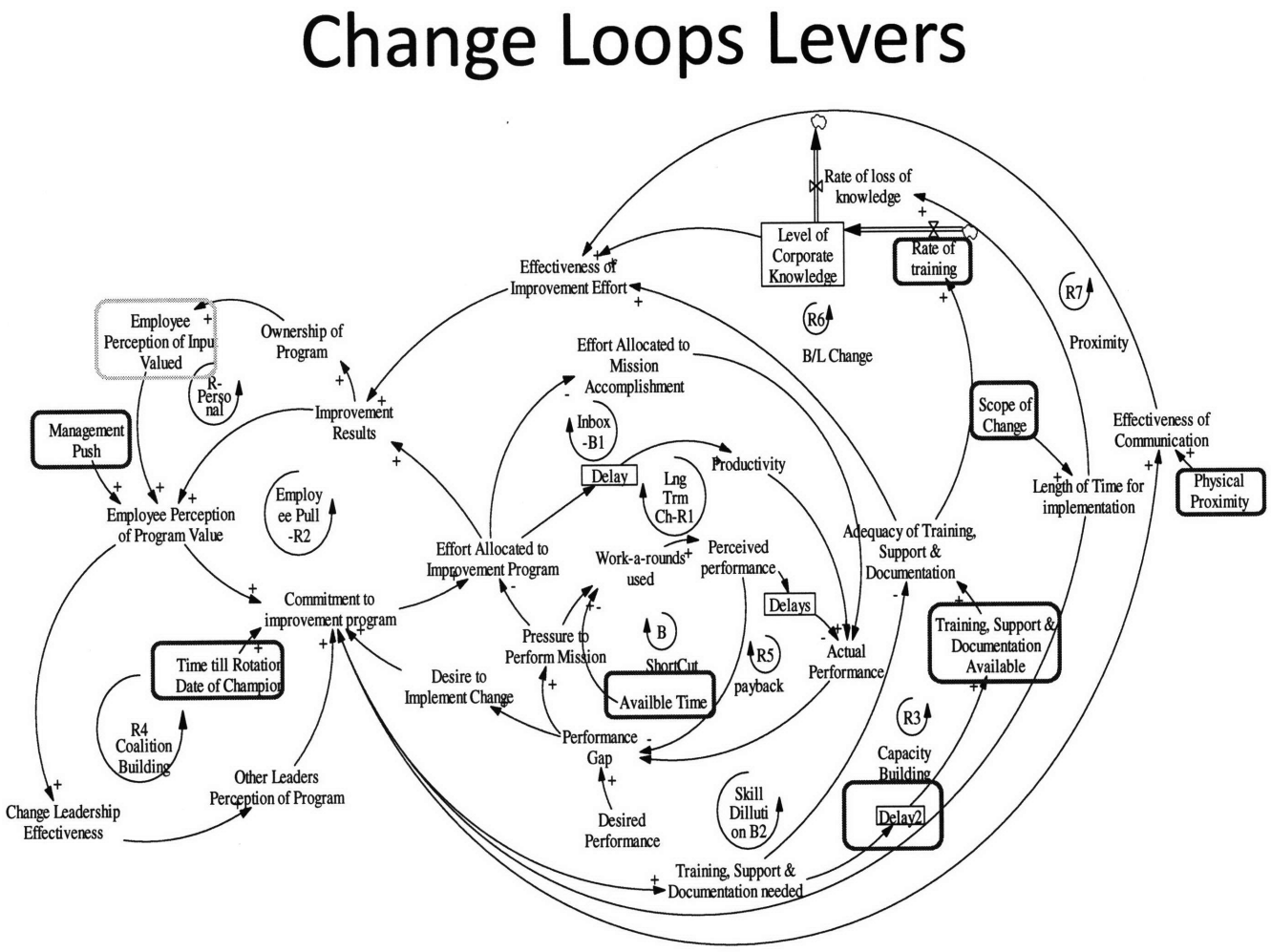

Figure 36-Loop levers.

The model in Figure 36 is complex and explains a lot of the dynamics seen during change implementation in the Coast Guard. First, we should realize that every change program goes through this dynamic. If, as a policy, we have many of these complex dynamics working for and against each other, this also creates a dynamic. For example, having a logistics organizational change, at the same time that we have a major cutter asset change, at the same time that we have an accounting system change, multiplies this model several times, and each of these models interacts with themselves, as well as with each other.

This is why, when policy decisions are made and change is introduced into this system, it can push back in uncanny, subtle or ferocious ways to maintain the balance it has already established. However, by understanding the complexities and expanding the mental model from

a linear-based theory to the feedback-centered dynamics outlined here, perhaps leaders can increase the probability of success of a transformation plan.

Embracing the complex system for all the levers it offers and realizing that there is control of this system if we attack it correctly. In the long-term, this model could be transformed into a stock and flow formal SD model. Metrics and measures could be used to calibrate the model and then changes could be applied as shocks to the system to test scenarios. In its current state, detailed analysis is a challenge to the average mortal as a result of its many connections and interdependencies, and because we do not know how strong different loops are. The calibration will correct this. For instance, we do not know what happens if the Personal Reinforcing loop is going negative while the Building Coalition loop is positive, what happens to effort allocated to the program. However, we do know some things and can make some recommendations based on the dynamics presented. We can also take advantage of the levers that are controllable, such as the scope of change, the time till rotation of the champion, the availability of time, and others. These will be discussed in the context of the current status evaluated through the lean enterprise analysis.

Exogenous Forces

There are forces outside of the Coast Guard that affect the service and force change. These forces are exogenous to the system model we have described thus far, but their influence should not be discounted. We have decided to draw the boundary of our model within the Coast Guard, but this organization is part of a larger organization, which is part of a nation, which is part of a global economy, and an expanded model would include many of these powerful dynamics forces.

McAllister (2004), in his thesis on Change Leadership, highlights some of the most dominant influences to change outside the Coast Guard.

> Global competition requires organizations to continually seek to reduce costs, improve performance and quality. One would think that because the Coast Guard is federal this would not apply, but Congress, the Presidential Administration and the public are demanding customers (rightfully so). Budget pressure, public dissatisfaction, privatization always loom around the corner. Coast Guard leaders are well aware that the Coast Guard has been the subject of disbanding or commercializing throughout its history and it is only by remaining proficient, diligent and viable that they continue serving.
>
> Global Economy continues to grow. As the economies of the world grow so does trade and since most trade comes via navigable waterways, the work of the Coast Guard continues to expand with vessel inspections, security, waterway safety, search and rescue and the list goes on.

Technology changes in communication, transportation, logistics, information and networking systems are on an increasingly fast cycle time for improvements. Keeping up is a mission requirement especially for law enforcement and homeland security.

Socio-cultural changes require the organization to think beyond next year if they are going to succeed. The Coast Guard is an all volunteer service and as such needs to recruit and retain qualified personal. It takes several years to grow a competent Coast Guardsman or women, so planning ahead for shifts in the culture are imperative.

Government policies change daily and are often motivated by things that are not necessarily Coast Guard related. "All politics are local". In addition, policy makers change every two years in some cases, so education of these stakeholders becomes a constant state.

For the Coast Guard, whose relationship and integration with the Department of Defense and in particular with the Navy are vital to success for several missions, any major changes by DOD may result in parallel changes within the Coast Guard.

The Coast Guard either launched, or was the subject of, a number of change initiatives designed to prepare the service for the future. These included the "Coast Guard Future Directions Study" by the Center for Naval Analysis, "Coast Guard 2020" done under Coast Guard contract, and the "U.S. Coast Guard 21st Century" done by the President's Interagency Task Force on Coast Guard Roles and Missions. Each study found that the traditional roles and missions of the Coast Guard were unlikely to change significantly during the first part of the 21st century, but the mission emphasis would shift based on changing national priorities. Critical points are listed below:

The World would remain in a state of continuous change.

Operations other than war (peace keeping, crisis response, counterterrorism) would proliferate.

U.S. Maritime Trade would double if not triple by 2020. Oceans and harbors would become increasing crowded and dangerous environments requiring more active management.

Waterways would increasingly become conduits for transnational threats such as pollution, over-fishing, illegal migration, drug smuggling, terrorism and the proliferation of weapons of mass destruction.

Finite resources and fragile environmental ecosystems would require increased protection of maritime resources.

> Technology enhancements would expand the ability to project maritime presence, to manage data, and to coordinate activities. (McAllister, 2004)

The recommendations can be summed up into three areas. The Coast Guard must modernize its equipment and infrastrucure using a systems approach in order to meet increasingly complex mission challenges. Major procurements for ships, command and control system of systems are underway. The Coast Guard must reshape its workforce to respond to the need for new skills and capabilities in a highly interconnected physical and virtual world, using knowledge-based processes to improve overall service deliver. Finally, the Coast Guard must make structural and related management changes to improve integration, innovation and functionality (McAllister, 2004). This is being addressed by the sectorization mentioned earlier, where the previous shore operation groups are combined with the previous inspectors and regulators of marine safety offices to create regionally-based sectors. In addition, the logistics functions are now under study as described in this thesis and the implementation of this change is forthcoming. What we must realize is that because of the exogenouse forces and the endogenouse forces, the target, the envisioned end state is a moving target, so understanding and getting good at succefully implmenting change is critcal.

An example of this is the recent organizational change to create sectors under Admiral Collins. The sector implementation combined the old '"Coast Guard Groups" with "Coast Guard Marine Safety Offices". This combination was touted as a blending of skill sets. The designators previously used to identify Marine Inspectors, as well as the designators used to identify operations ashore, were made the same with the idea that the Coast Guard officers would have skill sets, but would not be tracked specifically to MSO or groups, since they were one in the same: sectors. Then Admiral Allen became Commandant (endogenous force), and demand for services from the Marine community grew (exogenouse force). In a speech to the DC Propeller Club in September of 2007, Admiral Allen hinted about plans for increasing the number of Marine inspectors. In his 2008 State of the Coast Guard address, he confirmed the addition of over 200 marine inspectors from a variety of sources. This is, of course, a logical response as a public service, but it makes the point that exogenouse forces, combined with endogenouse dynamics, can make the future state a moving target. Understanding the dynamics of change implementation is like adjusting the aim while the arrow is in flight. It increases the chance of successfully hitting the moving target.

CHAPTER 6

Implementing a Transition Plan

A significant change in an organization design tends to disrupt the normal course of events within the organization. Thus, it frequently undermines existing systems of management control, particularly those embedded in the formal organizational arrangements. An impending change can suddenly make control systems irrelevant or cause them to be perceived as "lame ducks". As goals, structures and people shift, it becomes more difficult to monitor performance and make correct assumptions as one would do during normal operations (Tushman, 2004).

The transitional period is a critical factor in determining eventual success. As part of the lean enterprise analysis described in Chapter 3, our team, in concert with the LOAT, developed a current state. This chapter will focus on the transition plan recommendations. In light of the dynamics uncovered in the previous chapter, does the transition plan address key loops? Are there additional recommendations or modifications that should be considered? What is the next step in analysis?

After interviewing stakeholders and analyzing potential organization transformation impacts, we identified several transformation tasks: education, create database graphical user interface (GUI), change evaluation structure, create Kaizen teams, integrate with CG Headquarters Realignment, and Phased Reorganization. We articulated the dependencies among these tasks and also proposed that Lean or Change Champions be designated throughout the organization to ensure a supported and strategic roll out of change.

One of the key dynamics we mentioned in the last chapter was level of corporate knowledge. Realizing that most real, broad change would take longer than any Commandant's tour, having a civilian change position would be of value. This would help ensure each successive Commandant's changes, or those required by exogenous forces are aligned with long-term strategic objectives. This also allows major changes to be broken into more reasonable phases. By reducing the scopes several positive dynamics come into play.

Education

Our initial recommendation: The first step in the transformation plan is education. This is intended to explain the new vision, transformation plan, and lean practices to the Coast Guard.

Both operators and logistics providers need to understand the vision to fully accept the new organization and change. By eliminating angst, we anticipate more cooperation in transforming to the new enterprise. As a note, the employees and customers (operators) are already aware of the potential change from the realignment at higher (HQs) levels, and the logistics survey earlier this fall. Given the dynamics we discussed earlier, educating the masses should include a few primary considerations.

First, we know that, given the choice between mission and training, most members will choose mission. As we have seen, availability of time is a critical factor that affects whether or not a member will invest in an improvement program. We believe that recognizing the current "fire fighting" status of the operator and the logistics personnel is important. Since we have very little control over the demand for service, the next viable options is to increase the workforce. Strategically activating reserves for a period will add manpower, reduce pressure to complete the mission and allow time to train and perfect new processes.

Also, because people rotate on an average of every 3 years and this transformation is complex, a reasonable assumption for completion would be 5-8 years. This means that training needs to be held at an appropriate level for at least that long; training in regard to how and why we are transforming might be added to several existing training curriculums to keep the corps knowledge at the appropriate level.

Create Database GUI

Currently, all logistics services are "stove-piped" databases; each discipline has its own entry point, interface and training. In addition, many of the powerful capabilities of these databases are never accessed by the operator, though the logistics specialists may need them. We propose to create a graphical user interface as a front end that will tie all existing databases together. It should only include the top 20 logistics service requests that the operator normally uses day-to-day, for all other requests they can go to the logistics expert. This will provide a single place for the operators to request logistics services. We anticipate this taking 4-6 months to create. The front-end coding can begin immediately, with some of the process and metric revisions being incorporated later in the programming process. The GUI development can be done in parallel with other activities. Again, referring to the model, it makes sense to allow the primary users to have input on the top 10 to 20 items that they do every day. To allow them to communicate with a panel through blogs as the GUI is developed will create buy-in CG wide. Since the actual databases will still exist, the professional logistics are unaffected by those that choose not to use it. Those that do use it, the operators, should receive a direct and immediate benefit, which should turn the employee pull loop to positive and reduce the number of work-a-rounds by speeding up processes.

Change Evaluation Structure

The evaluation structure will be the first organizational change after the education is complete. This involves modifying who completes evaluations for each employee. Currently, an ISC employee is evaluated by three individuals: the employee's supervisor, a reporting officer (who is one level above the employee's supervisor), and an approving official, whose role is to double-check the evaluation for quality. We propose first changing the evaluation structure for one key individual: the Sector Logistics Officer, who is currently evaluated by individuals in the Operations chain of command. The SLO should continue to have the Sector Commander as supervisor, but should instead have the other members of the evaluation process be in the logistics chain of command. This puts the SLO in the role of balancing operational (day-to-day missions requirements) and logistics (long-term thinking) goals. While this is a difficult position for the SLO, a successful balancing of logistical and operational goals is the key to an implementation of mission-level services that align with the CG organization's long-term strategy. It will also facilitate cooperation between operators and logistics personnel, allowing operators to build trust in logistics services so that they can divest of logistics work that they currently do alone. The figure below shows the organization structure where the Sector Logistics staff works for, and is collocated with, the Sector Commander, but also works for the ISC Commanding Officer as his reporting officer (the primary signature on the evaluations).

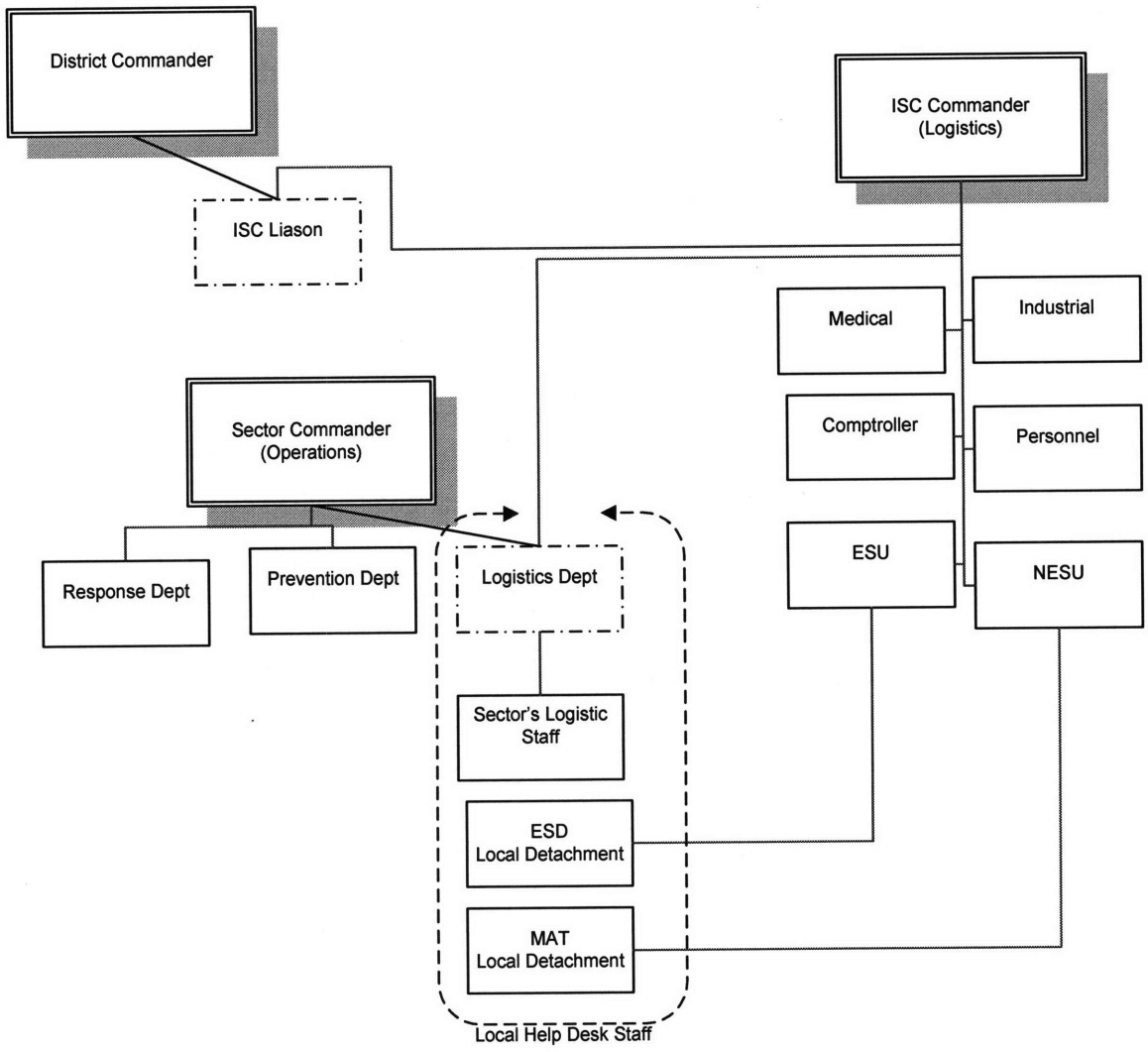

Figure 37-Change in rating chain only.

The change in evaluation structure will then flow down to other individuals in Sector Logistics, whose rating chains will be adjusted accordingly. Like the changes being made to the evaluation process for the SLO, evaluation changes for individuals working below the SLO will assist in alignment between operational and strategic needs. The duel chain of command balancing mission with strategic objectives for each person via the rating chain should be very effective, given that the number one motivator for employees is mission performance and the number two motivator for employees is their evaluation, according to the LOAT surveys. This would allow individuals from Sector Logistics and the Operating Sector to gain an initial awareness of employee performance from operational and logistical perspectives, and would give logistics employees, as well as their supervisors, an incentive to understand operator needs.

In light of the dynamics, as no one will really be changing location or mission, altering the chain of command, in essence, aligns the motivations. In the dynamics, we have seen that

there are choices to make every day on "inbox" or "long-term". The current evaluation form recognizes this by staggering signatures. The first signature on the evaluation form is the supervisor that manages the day-to-day work of the employee. The second signature is the reporting officer, who evaluates how the member aligns with the longer term strategic objectives of the organization. Finally, the approving officer ensures that the comments made align with the numbers assigned and serves as an objective check. By utilizing the existing tool, employees will more clearly see the difference between the two priorities and consciously make decisions, whereas currently, if your chain is all operational, everyone up your chain may be focused mainly on getting the mission done. Many people worry about having two different types of supervisors, but there is research to support that members learn at an early age how to manage two managers at one time. "Mom and Dad" can be pitted against each other, or communication can be facilitated, and the entire family can be more productive.

Kaizen Teams

Kaizen teams will also be formed. The two initial Kaizen teams will focus on processes and metrics. The lean education will initiate with the "education" step, but will be ongoing, in an effort to continually improve the organization.

This study has focused on high-level processes, but there is a great deal of improvement to be gained by streamlining lower level processes, as well. As the processes are so different due to the nature of the enterprise, a look at the individual processes should reveal many more improvements. Also, this team will now have people who were previously in many different areas (organizationally), and will be able to leverage the good practices of the other areas.

In light of the dynamics and the responses from the survey, it is clear that most operators have very little time for additional investment in learning. As mentioned earlier, activating reserves and streamlining the improvement process in the organization would create positive reinforcing loops. Streamlining process improvements CG wide will reduce work-a-rounds and increase ownership and value of the program.

Integrate with CG Headquarters realignment

Throughout the entire transformation process, the upper levels of the CG are also undergoing realignment. It is therefore important that the plan for transformation be in tune with that realignment to ensure that they integrate well together. One thing that is clear is that input from the field should be valued. In an effort to demonstrate this, a clear path for enterprise process improvement needs to be established. Currently, most of the enterprise processes are CG Headquarters units and, therefore, their primary motivation is to respond to their program manager. This needs to be balance if, not re-focused, on field level initiatives.

Transparency is also a key motivator for building coalitions, employee pull, and personal ownership. With the current technology, opening the doors on the transformation groups

meetings, allowing chat from the masses, posting progress and allowing comments are actions that will tend to push several loops to move in a positive direction.

CHAPTER 7

Summary

Henry Kissinger wrote, "Before I served as consultant to Kennedy, I had believed, like most academics, that the process of decision making was largely intellectual and all one had to do was walk into the President's office and convince him of the correctness of one's view. This perspective I soon realized is as dangerously immature as it is widely held" (Tushman, 2004). The easy decisions, those with clear right and wrong answers, never reach the head of an organization. Unfortunately, things are seldom clear cut or obvious. There are complex interactions, constantly changing dynamic forces, multiple dimensions and multiple methods of evaluation. There are countless examples of policy decisions that had unintended consequences because the systems were not understood. Studies have shown that many road building programs designed to reduce congestion have often increased traffic delays and pollution; low tar and nicotine cigarettes actually increased the intake of carcinogens and policies of fire suppression wound up increasing the size and severity of forest fires (Sterman, 2000). The people that create these policies have a model in mind and believe they are correcting an issue. Reality is the system is probably more complicated than they realize and therefore they inadvertently make the issue worse. Given the tremendous demand for services on the Coast Guard and the limited resources available, it is critical that leaders understand the system dynamics when making policy decisions. This will increase the probability that the policy is implemented efficiently, that is it effective and that it produces the desired goal.

The consequences of our decisions are often only known long after the fact, and even then with some ambiguity. It would be nice to be able to test different decisions against a robust model that can be updated with actual metrics to gain better insight into the possible "side effects" of policies before we implement them. This thesis is only the first stage in the development of such a model, but every long journey begins with the first step.

In this thesis, we used the Enterprise Value Stream Mapping and Analysis (EVSMA) tools, developed by the Lean Aerospace Initiative. These tools are used to evaluate an organization with the goal of becoming a lean enterprise. Although the lean analysis was focused on District 1 and the Integrated Support Command, we feel as though the problems discovered are enterprise-wide for several reasons. First, the organization is fairly homogeneous with regards to motivation. The core values are recognized and adhered to throughout the Coast Guard. The drive for mission performance is paramount throughout. Many of the processes we investigated are enterprise-wide processes, not just regional. In addition, because people rotate so frequently within the organization, there is commonality in many of the issues raised that I have seen throughout my career and that were insinuated or mentioned in the previous Sloan Fellow

thesis we reviewed. Finally, statistics have shown that interviewing a statistically relevant sample of a larger population will produce accurate estimations of the larger population.

Given all this, we applied the problem set discovered in District One to the entire organization. Using the tools, analysis techniques and data from the LOAT surveys, we developed a list of improvement areas. From all the studies and research we conducted, it became clear that, more often than not, even if there exists a good plan to implement change, if the current state is known and the vision for the end state is clear, organizations rarely successfully reap the benefits of their efforts.

We decided to use SD to better understand the dynamics of change with the hope that this would increase the chances of a successful lean enterprise implementation. The model we built outlines the complexities, interactions and dynamics of change management in the Coast Guard. Armed with this model, we were able to make policy recommendations to correct the waste that was discovered during the lean enterprise analysis. The changes proposed are made with due diligence to all the dynamics discovered and we believe have a greater chance of success.

The goal was to create greater synergy and a more holistic approach to process improvement, which should lead to greater flexibility and responsiveness while still maintaining configuration management and strategic life cycle system vision. True Lean Enterprise is a journey, and these are the first steps. Rather than having too many changes happening at once, or a major organizational change in the midst of rising demand while recovering from another recent organizational change, which reduces the chance of success for all, our recommendations are modest first steps which we believe will make major improvements in the performance areas most desired. The major problems we found during the EVSMA were in processes and metrics. The change in the rating chain for the Sector Logistics Officer, are the first steps to aligning the metrics. The Kaizan teams and the realignment of the Coast Guard Headquarters, we hope should help streamline the process improvement bureaucracy. The GUI is also an interim fix to improve the processes in a more tangible and immediate way.

The complementary methods of EVSMA and system dynamics were very useful, and the data collected was used for both. Although the lean enterprise analysis, like most others, tends to focus on gauging current status, defining the future state and going through some steps to implement change, we found the information garnered during the evaluation was incredibly useful when combined with the SD model. We believe that, by doing this, not only can great improvements be effectively implemented, but we also believe that they can be measured. Perhaps more importantly, the cost of not changing can also be measured through scenarios.

Follow on Work

This is the beginning of a viable causal loop model for change implementation. We believe that this can be expanded into a formal SD model with stocks, flows and delays

enumerated with quantifiable metrics. These metrics would allow three things. First, an opportunity to test policy decision against different metrics to find what was needed to ensure the system was turning in a positive reinforcing way. Second, it could serve as a gauge for progress as the transition is under way, so that leaders can capture symptoms of failure early and adjust according to correct. Third, it could be encapsulated into a game and used as a training aide to facilitate learning by leaders and employees alike, much like in the BP case mentioned.

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Appendix: Acronym Table:

ADM	Admiral
C2CEN	Command & Control Engineering Center
CDR	Commander
CEU	Civil Engineering Unit
CG	Coast Guard
CGMA	Coast Guard Mutual Assistance
CO	Commanding Officer
DHS	Department of Homeland Security
DOD	Department of Defense
ELC	Engineering Logistics Center
ESD	Electronics Systems Support Detachment
ESU	Electronic Systems Support Unit
EVSMA	Enterprise Value Stream Mapping and Analysis
FINCEN	Finance Center
FLIPT	Field Level Integrated Planning Team
FPD	Federal Procurement Desktop
GFE	Government Furnished Equipment
GUI	Graphical User Interface
GV	Government Vehicle
IDP	Individual Development Plan
IS	Information Systems
ISC	Integrated Support Command
ISD	Industrial Support Detachment
ISO	Industrial Service Order
KSA	Knowledge Skills and Abilities
LAEI	Lean Aerospace Enterprise Initiative
LE	Lean Enterprise
LESAT	Lean Enterprise Self Assessment
LOAT	Logistics Organizational Alignment Team
MAT	Maintenance Augmentation Team
MLC	Maintenance Logistics Command
MSO	Marine Safety Office
NESU	Naval Engineering Support Unit
OJT	On the Job Training
OMB	Office of Management and Budget

OSC	Operations System Center
PQS	Personal Qualification System
R&D Center	Research and Development Center
SD	System Dynamics
SIPOCS	Suppliers, Inputs, Process, Output and Customers
SLO	Sector Logistics Officer
TISCOM	Telecommunication and Information Systems Command
TQM	Total Quality Management
VADM	Vice Admiral