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## Army Supply Chain Management: Trends and Parellels with Industry

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# Army Supply Chain Management: Trends and Parallels with Industry

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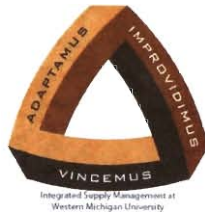
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## Committee:

Dr. Bret Wagner *chair*  
Dr. Thomas Edmonds  
LTC (Ret) Donald Phillips

Dr. Bruce Ferrin  
Dr. Sime Curkovic

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## **Abstract**

The following documents have been assembled together as my capstone thesis project for the Lee Honor's College. My study took place in several distinct parts but all occurring under the theme of supply chain management and how the tools and concepts used by private industry also emerge in the public sector, specifically the Department of Defense and the United States Army. My research was chaired by Dr. Bret Wagner with Dr. Thomas Edmonds, Dr. Bruce Ferrin, LTC(Ret) Donald Phillips and Dr. Sime Curkovic as the supporting committee. Each of these individuals mentored and directed my studies as they pertained to the topic of this document.

My thesis document can be viewed as an evolution of my learning and experiences in supply chain management as an employee of the United States Army. To begin the reader will find a presentation I delivered as the keynote speaker at a joint professional conference between APICS (the Association for Operations Management) and ISM (the Institute of Supply Management) on 11 November of 2010. The topic of the conference was the parallels that exist between private sector and Army supply chain management.

In support of that this document also presents the work I did which enabled me to deliver my presentation. The next piece of work is a research paper which is currently pending publication. The topic of the paper is the Weapon Systems Acquisition Reform Act of 2009, its current progress and potential impacts on future acquisitions.

The last two pieces of this document are directed studies that I conducted under faculty supervision while working for the United States Army. First is a web blog where I shared my experiences and topics from my work over the summer of 2010. The final document is a series of investigative looks into how the Army is utilizing the current trends which are emerging in the supply chain domain.

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Slide 1

## Army Supply Chain: Responding to a Rapidly Changing Environment

**“The more I see of war, the more I realize how it all depends on administration and transportation..It takes little skill or imagination to see where you would like your army to be and when; it takes much more knowledge and hard work to know where you can place your forces and whether you can maintain them there.”**

**General A.C.P. Wavell**

Good evening and thank you for having me here tonight. My name is Matthew Olson and I am here representing Western Michigan University. I am currently a senior in the Integrated Supply Management program. I have spent a lot of my academic career focusing on supply chain management within the US Army. For me it all began with an internship I received with US Army TACOM 2 years ago which turned into a career development position. I have spent a significant time in my studies looking at how the concepts I have been taught in SCM translate into the military domain. I want to briefly make it clear that in no way am I here tonight representing the interests or the policies of the Army or the department of defense.

Slide 2

## Overview

- Parallels Between Private Industry and the Military
- Logistical Successes and Challenges
- Acquisition Challenges in the current environment

So where are we going tonight. Given this opportunity I tried to select a few concise topics in which I believe will help paint a good picture of the Army's operating environment. I am first going to talk about some parallels that exist between private industry and the military. Then I would like to highlight some interesting facts about Army logistics. And finally I we will look at the acquisition environment and consider some of the emerging trends.

Slide 3

## Common Trends

### Private Sector

- Identifying the Market
- Customer Behaviors and Tastes
- Emerging Technologies
- Forecasting Demand
- Developing Markets

### Military

- Identifying Threats
- Enemy Behaviors
- Emerging Technologies
- Forecasting Demand
- Changing Combat Environments

**Responsiveness**

There are many parallels that exist between the military and the private sector. And I believe it all comes down to understanding your operating environment and developing solid business processes to meet those demands. Just as in the private sector the military is currently facing rapid and unpredictable changes. As you can see from the slide you can pretty much replace the word market with threat and consumer with enemy to get a good idea of the similar challenges we face. I believe that in both worlds these rapid changes are being driven by how quickly new technologies are being adopted. This in turn is influencing consumer or enemy behaviors, and creating new markets or threats which our supply chains must respond to. And responsiveness has become a critical success factor to operating efficiently and effectively today. We all must focus on how quickly we are able to respond to our rapidly changing environments.

Slide 4

## Logistics

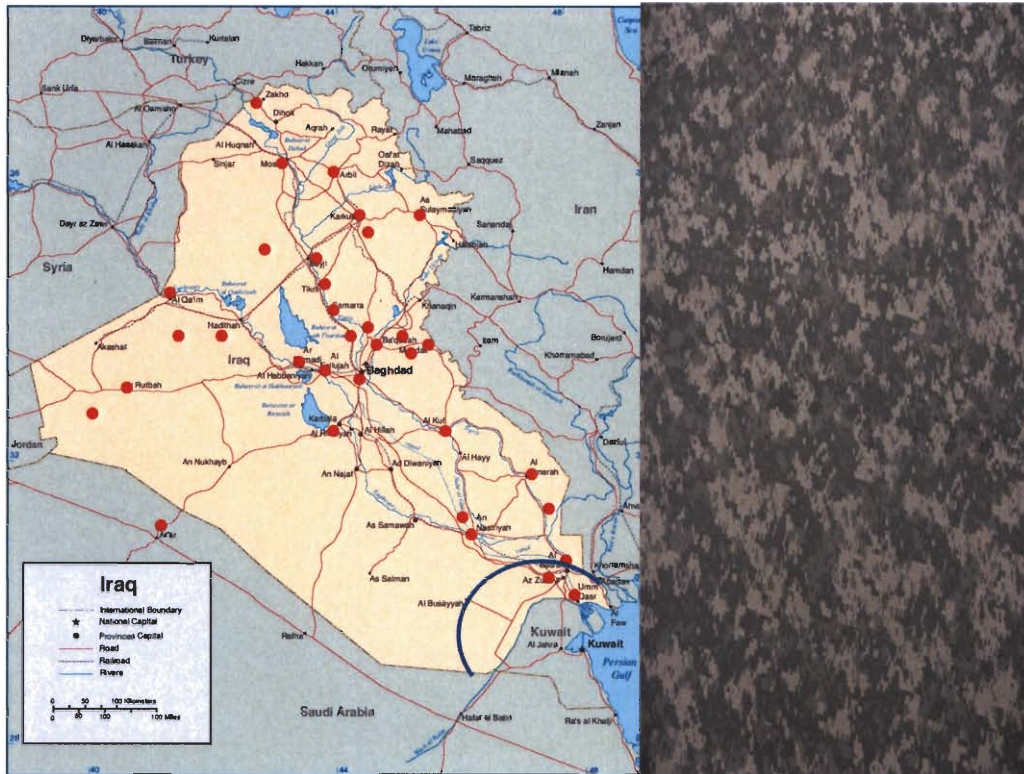
- Staging Areas
- Fewer Supply on Hand
- Increasing Supply Lines/Distribution channels



The ability to respond and be effective today requires lean models and a great amount of agility. The trend in the private sector over the past 20 years of developing lean and agile supply chains has really been no different in the military. Here you are looking at one of the biggest staging areas in the Middle East, Camp Arifjan. Arifjan is where nearly all military supplies and equipment come first before being deployed in to the environment. From the picture you can get a good idea of how challenging it can be to hold so much inventory and effectively distribute supplies. Over the past 20 years the Army has made drastic improvements in handling this amount of supply. Using many of the tools and concepts developed by leading logisticians and supply chain managers the army has been able to lean out the supply lines from carrying about 60 days worth of supplies in the early 1990s in Desert Storm, to now where they have only 5-7 days of supplies on hand. Not only are there fewer supplies on hand but the Army is now supporting a higher number of troops who are spread out across much greater distances.



## Slide 5

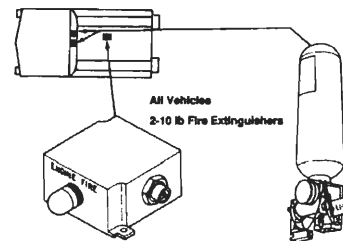


This next slide is meant to give you an idea of how the lines of supply have increased and more geographically spread out since Operation Desert Storm. First you will notice the blue line which represents the desert storm occupation, commonly known as the great left hook. In order to liberate Kuwait the U.S. forces strategically occupied the southern desert region of Iraq which is mostly unpopulated and relatively undefended, cutting off the Iraqi supply lines. In contrast we turn to operation Iraqi freedom where the occupancy was wide spread and sustained across the country. Each of those red dots represents a major installation or forward operating base where the army conducts its tactical level missions. To me it is a pretty impressive logistical feat to be able to sustain more forces, in a much larger area, for significantly more time, while holding just over about 1/10<sup>th</sup> the amount of supplies as 10 years prior.

Slide 6

## How Lean is too Lean?

- Automatic Fire Extinguisher Valve Problem
  - Unstable Demand
  - Inadequate Visibility
  - Expediting to save lives



There is a great amount of pressure today to lean our supply chains and move towards agility to be able to respond the rapid changes in the environments that we operate in. But I think it is always important to ask how lean is too lean. I am sure that you all experience this problem within your industries when you are dealing with critical parts and supplies. Sometimes it just makes more sense to carry a greater amount of safety stock and hold that inventory to prevent catastrophe or a total shut down of your production line. And this is no different the army. The army has been fighting an insurgency that has very active weeks and months, followed by periods of inactivity, and then resurgence. The instability that exists makes it very difficult to predict demand for certain critical items.

Here I have a picture of a vehicle fire extinguisher system and I will tell you a brief scenario that I faced in my first few weeks of working with the Army. One of the biggest concerns for the army in designing vehicle is survivability. That is why systems like automatic fire extinguishers are critical. A vehicle that is equipped with these can make the difference between walking away from an attack unharmed, or suffering horrible or fatal injuries. Whenever these systems are triggered that valve at the bottom of the valve must be removed, cleaned, reset, and replaced. When I began my with the army this process was being handled

back in the US. This means that every time one of these valves popped off, it had to be shipped back stateside for refurbishment before returning to Iraq. In my first few weeks working with the army I began receiving calls and reports from the field stating that vehicles were being operated without working fire extinguisher systems because the soldiers were not receiving the valves they ordered.

There were two main factors here that were limiting the effectiveness of the system. First, this occurred during a period of resurgence where the number of IED attacks had unexpectedly increased over 400% from the last month. The second factor was that there were indeed enough valves in the Middle East to meet demand, and I will refer back to my picture of Arifjan, the velocity of material moving through this staging area allows shipments to get lost in transit. So while my team was able to identify that the valves were in somewhere in Kuwait, we knew it would take days, maybe weeks to locate them and push them through the lines of supply to the soldiers in the field. The immediate solution to this problem was an expedited shipment to meet the demand for this critical part. I am sure you can imagine how expensive it is to FedEx a 15lb part 6000 miles. But we must choose to expedite when the stakes are high, and in this situation it meant potentially saving lives.

In the long run however, expediting shipments not a viable option, so the army and my team worked to develop what is known as the Expeditionary Fire Suppression Refill Trailer, more commonly referred to as the FMM3, which enables the soldier to refill and reset the systems in the field, which dramatically improves the supply chain.

Slide 7

## Acquisition Challenges

- Scope Creep
- Procuring Immature Technologies
- Rapid Acquisition

Moving forward I would like to take about some of the challenges that exist with Army Acquisitions. One of the biggest impediments to success that I have seen is the problem of scope creep. I am sure many of you have experienced this challenge as well, especially any program managers that may be here. But in the army I have noticed a unique driving force to this problem. Our rapidly changing environment means that the threats that exist today may be quite different from the ones that exist in the near future. Unfortunately this can lead to many engineering changes as the current workforce tries to adapt an acquisition program to the current environmental threat; which causes an overall extension of the acquisition cycle time. These problems frequently lead to discontinuities between the overall mission of a program and the product that is actually delivered.

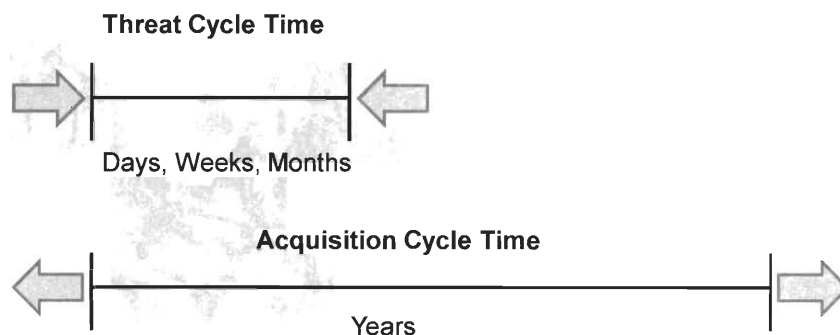
Another problem that the army faces is procuring immature technologies. This problem arises under similar conditions as the last. But it is unique because here we incorporate the challenges that are faced with lifecycle management and sustainment of army assets. New product development and acquisitions are made under the assumption that the vehicles the army procures need to have a useful life that spans the decades to come. But it is difficult to plan requirements for an environment and threats that don't yet exist. So there is a tendency to

procure technologies that the army predicts will meet the demands of the future threats. And often times these technologies are still in development and not ready for deployment.

Slide 8

# Acquisition Challenges

## Cycle Time



These problems along with others contribute to an expanding acquisition cycle time. I will call it unstable at best but I have seen figures that put the time frame at between 5 and 9 years. At the same time we have a rapidly decreasing threat cycle time, which is often measure in days or weeks. The insurgency we are currently fighting is quick to adapt new technologies, incorporate new triggers, or different accelerants into their road side bombs for example, that make the threat cycle short and constantly changing. At the same time, the challenges I outlined previously contribute to the expansion of the acquisition cycle time. Coupled together you can see that there is a large gap between the two and our military leaders and civilian forces are fighting to close this gap.

Slide 9

## Rapid Acquisition

- Mine Resistant Ambush Protected Vehicle (MRAP)

How the Cougar 4x4 Mine Resistant Ambush Protected (MRAP) vehicle compares to the up-armored Humvee M1114:



MRAP		Humvee	
108 inches	Width	91 inches	
104 inches	Height	75 inches	
233 inches	Length	196.5 inches	
38,000 lbs.	Maximum weight	12,100 lbs.	
5-10	Crew	4	
330 hp	Engine	190 hp	
65 mph	Maximum speed	78 mph	
5,000 lbs.	Payload capacity	2,300 lbs.	
800 miles	Range	275 miles	



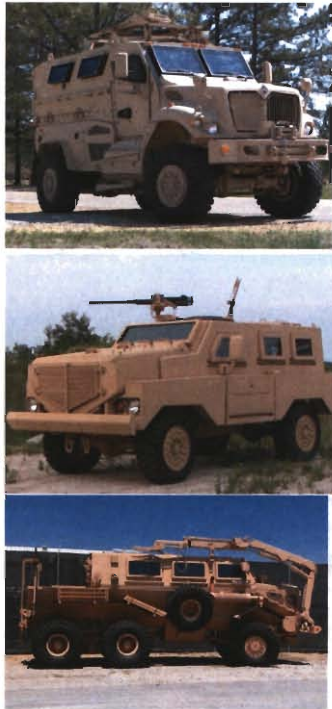
V-shaped hull  
deflects force of blast  
away from crew.

Flat underside  
catches full force of  
blast through the floor.

Sources: Credit Suisse; Force Protection Inc. (forceprotection.net); globalsecurity.org; insidedefense.com; janes.com  
By Frank Pompa and Karl Gelles, USA TODAY

This leaves us with the question of how is the army to overcome an expanding acquisition cycle time, and be able to respond to the quickly changing environment? One solution that has been used is rapid acquisition. I would not be quick to advocate this method because while it may be successful in meeting the needs of the soldiers today, it causes just as many problems as it solves. I am going to use the Mine Resistant Ambush Protected vehicle, known as MRAP, to give you some insights into this process. The MRAP concept has existed in other militaries since the 1990s but it was brought into the army in the early 2000s. When we entered Iraq we did it with great strength and speed. The army did not have adequate time to predict and plan for the threats that it would face in that environment, the biggest of which was IEDs. A standard army HMMWV was not designed to handle this threat. It quickly became apparent that the army needed something bigger, stronger, and built to sustain an IED attack. The solution was MRAP

Slide 10



## MRAP

**BAE SYSTEMS**

**GENERAL DYNAMICS**  
*Strength On Your Side®*



**NAVISTAR**  
*DEFENSE*

**OSHKOSH**

**TEXTRON** Defense Systems // TEXTRON Systems

So the army went to industry and said “here are our requirements, we need prototypes now, and production needs to start immediately”. 8 designs in all were solicited, and of those 6 manufacturers were selected. Those 6 manufacturers built multiple variations of the vehicles to fit the various needs of different units in the fields. When all was said and done the Army ended up with 33 known variations of MRAP, and hundreds of different vehicles in inventory. The real challenge that is created is developing sustainment programs for these vehicles life cycles. There was originally minimal commonality and interchangeability between the MRAP vehicles, which has since improved some. Each one requires different repair parts, special tools, operating and repair procedures.



Slide 11

## Threat Life Cycle



### Powerful roadside bomb

The explosively formed penetrator (EFP), designed to pierce armor at long distances, is being used by Iraq insurgents.

1. Vehicle trips sensor, detonates EFP.
2. Projectile hits at high speed, penetrates armor.

#### Why it's so deadly

Metal pipe Explosive Curved copper or steel disk



Heat, shock wave from detonation propel disk, soften it into rod.



Example: 1 lb. (500 g) rod traveling about 1.2 mi. (2 km) per sec. can pierce more than 4 in. (10 cm) of hardened steel armor.

Source: Air Force Research Laboratory, Global Security. Copyright: Leaf Publishing, July 2006.

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This method while very effective, lacks efficiency, but has become necessary in the new operating environment. The cornerstone the rapid acquisition model is to enable the army to respond to the immediate threats, and quickly adapt to future threats. This was the idea behind the conception of the rapid equipping force which is a team that designs and implements effective solutions as quickly as possible. On this slide you can briefly see how this process works. Rapid Acquisition brought us MRAP to combat the use of IEDs. The insurgency quickly noticed the decrease in IED effectiveness against the new vehicles and turned to Rocket propelled grenades to destroy the new vehicles. The rapid equipping force found that installing a type of armor that would cause the RPGs to detonate at a standoff greatly decreases the RPGs effectiveness, which led to this bird cage design you see around this lower picture. And again the insurgency quickly adapted and began using a new strategy, explosively formed projectiles, in their road-side bombs. The EFP is designed to penetrate the MRAP armor while not succumbing to the stand off distance.

Slide 12

## Response v. Planning



The downside to using this method is a very short, if any, planning horizon. On the right here you have the vehicle that has been in development as the HMMWV replacement for many years. But the challenges the army faces in the acquisition process has hindered the ability to get this vehicle built and deployed to the field. While this vehicle meets some of the needs and requirements of the new environmental threats, it will suffer the same challenges as MRAP when it is deployed, a highly adaptable, rapidly changing enemy. So it is not easy to say that effective planning could have solved the need that was met by the MRAP program. The army is now faced with a delicate balancing act in the allocation of its resources. Should funding put towards planning for the future and trying to predict threats that don't yet exist? This method improves the efficiency of the army supply chain and allows for lean operation, but greatly lacks the necessary responsiveness. Should the army reserve funding for implementing these immediate ad-hoc solutions that are effective at fighting the insurgency and saving lives? This method is highly effective but adds a great deal of complexity to the supply chain and makes the task of asset sustainment and lifecycle management extremely difficult. So there is no tell-all solution, and there are many people who are struggling with these issues every day.

## Summary and Key Points

- Parallels exist between the challenges faced by Military and Private Industry's supply chains
- There are trade offs between being highly efficient and being highly effective
- Solving acquisition challenges will ensure better more efficient support for the Warfighter

In Summary, There are many parallels that exist between the military and private industry supply chains. Both are constantly challenged with the difficult task of predicting future trends and behaviors with the rapid advancement of technology. Tradeoffs exist between being highly efficient and highly effective and there are significant impediments to overcome if the army truly wants to have the best of both worlds. Which leads to rapid acquisition, I think many people wonder if this is really the strategy the army wants to be pursuing, but it has become necessary in the current environment. So if they choose to plan long term courses of action, how do they accurately predict the requirements when the future threats may not exist yet?

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**Weapon Systems Acquisition Reform Act of 2009:  
Reflections on Past Programs and the Implications  
on Future Acquisitions**

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Matthew C. Olson

Dr. Thomas Edmonds

Dr. Bruce Ferrin

Western Michigan University

## Abstract

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In May of 2009 the federal government enacted public law 111-23, the Weapon Systems Acquisition Reform Act in order to fix a system that has been broken for many years. The Senate Armed Services committee, who spearheaded the bill found four main factors that are influencing uncontrolled spending in the department of defense: Unrealistic cost and performance estimates, unrealistic schedule estimates, use of immature technologies, and adopting costly changes to ongoing acquisition programs. This paper will explore those topics using examples of major defense acquisition programs from across the joint services. It will try to explain why the Weapon Systems Acquisition Reform Act was enacted and how the language it incorporates intends to directly address the inherent flaws to the defense acquisition program.

### Keywords:

Weapon System Acquisition Reform Act of 2009, Major Defense Acquisition Programs, Public Law 111-23, Defense Procurement, Senate Armed Services Committee, Department of Defense, Budget, Spending

## Abbreviations

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AT&L	Acquisition Logistics and Technology
DoD	Department of Defense
FCS	Future Combat Systems
GAO	Government Accountability Office
KC-X	Replacement Aircraft for the Current KC-135 Fleet
LCS	Littoral Combat Ship
MDAP	Major Defense Acquisition Program
SASC	Senate Armed Services Committee
USAF	United States Air Force
WSARA	Weapons Systems Acquisition reform Act of 2009

## Introduction

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Throughout this past decade, the American public has become increasingly concerned about the fiscal policies of the United States Government. Beginning in the year 2000 we saw unprecedented growth in the amount of public debt as a result of dramatic increases in spending by our leaders in office. As a result, many official policies, federal departments, and offices have come under scrutiny. The Government Accountability Office (GAO), as well as congressional committees, auditors and watchdog groups have authored and released reports on topics ranging from rogue spending, inadequate cost controls, and inefficient operating methods. Areas such as health care and social security are often seen by the public and portrayed by the media as the “big-ticket” items. They incur much debate, causing frustration for all American stakeholders as many of them continue without resolution. But in May of 2009 the newly elected 44<sup>th</sup> President and the 111<sup>th</sup> Congress in its first session agreed on one thing, that the era of irresponsible spending in the Department of Defense had to stop.

On May 22, 2009 Public Law 111-23, known as the Weapons Systems Acquisition Reform Act (WSARA) of 2009 was enacted into legislation. According to Sen. Carl Levin, Chairman of the Senate Armed Services Committee (SASC), “We have an acquisition system at odds with the best business practices in the world.” The WSARA attempts to usher a new culture into the Department of Defense (DoD) Acquisition, Logistics, and Technology (AT&L) community, intended to fix some of the problems associated with the major defense acquisition programs, known as MDAPs. Sen. John McCain, Ranking Member of the SASC, when initially bringing the bill before Congress stated that acquisition programs fail “because of fundamental flaws that are endemic to our acquisition system” (111<sup>th</sup> Cong. SASC 2009).

The AT&L consists of those military commands, military and civilian leaders, as well as their subordinates that are responsible for aligning the future requirements of the DoD with the acquisitions performed. Between 2003 and 2009 the number of MDAPs had risen from 77 to 96, the total planned financial commitments rose from \$1.2 trillion to \$1.6 trillion, and the average delay in initial capabilities rose from 18 to 22 months, respectively (GAO 09-326SP). The SASC was able to identify four major factors that commonly lead to failures of MDAPs to end on time, budget, and meet initial requirements:

- Unreasonable Cost and Performance Estimates
- Unrealistic Schedule Estimates
- Use of Immature Technologies
- Adopting costly changes to requirements, production quantities, and funding levels in the middle of ongoing programs

All of these have been addressed in the final version of the WSARA.

In the next pages this paper will use MDAPs from the Army, Navy, and Airforce to illustrate how these factors exist within all of the uniformed services. These examples will then be used to explain how the policies put forth in the WSARA attempt to resolve these “fundamental flaws...to [the] acquisition system” (111<sup>th</sup> Cong. SASC 2009). This paper will conclude by discussing some recent updates to the

WSARA and postulate whether the future of the law will meet the intended objective of reducing overall DoD spending.

## Cost and Performance

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The federal government's use of competitive bidding on all open solicitations is partly responsible for the problem of unreasonable cost estimates. In order for a contractor to have their proposal considered, they must submit a bid that is in a reasonable range but beats out the competitors' bid in the process. Over the past decades there has been a tendency within the defense industry to low-ball cost estimates on the initial bid in order to beat out the competition. One of the most controversial DoD solicitations, the Air Force's KC-X Strato Tanker program tried to overcome this inherent flaw with a "solicitation...for award on a 'best value' basis" (GAO B-310372.3). The contract established best value factors to try to overcome the problems associated with low-balling the initial estimates. It called for "mission capability, proposal risk, past performance and [finally] cost/price" to all be considered in order to award the contract on the best value rather than only the lowest cost (GAO B-310372.3). However it has been stated that the current contract "ends up being a cost shoot out, which incentivizes a race to the bottom" as the contract "puts heavy emphasis on cost" and "unless the two bids are within 1 percent of each other...then 'the award will be made to the low-price, technically acceptable proposal" (Gretler 2009). In determining the best value factors the solicitation "includes 373 pass/fail threshold requirements for participants" which "eliminates and marginalizes many of the things that the warfighter highly valued" (Gretler 2009). The increased focus on cost "prioritizes cheaper tankers" as "cost is the predominant driver and capabilities...have taken a secondary role of importance" (Gretler 2009). It is said that the pass/fail thresholds greatly "omit risk when evaluating if bidders can stay on schedule or keep their promises on price" (Gretler 2009).

With the KC-X contract, industry disputed whether the DoD source selection authority (SSA) had adequate methods of evaluation in place to accurately determine the true best value of the MDAP solicitations. In a protest filed with the Government Accountability Office (GAO), Pemco Aeroplex maintained that "the agency's evaluation of proposals was flawed in regard to various aspects of procurement, including its consideration of price realism" (GAO B-310372.3). In the contract in question, Pemco Aeroplex and the disputed firm submitted the contending proposals in which most of the best value factors were found not to be "significant discriminators" (GAO B-310372.3).

Thus, the disputed contract was awarded to the firm based on the lowest cost. Under the protest and the ensuing investigation, the GAO found that "the agency's [United States Air Force, USAF] procurement record contained no documentation regarding a price realism analysis" (GAO B-310372.3). The GAO then required the USAF to perform and document a price realism analysis but thereafter stated that "Although the Federal Acquisition Regulations (FAR) identifies permissible price analysis techniques, it does not mandate any particular approach...price realism [and] risk...are generally within the sound exercise of the agency's discretion" (GAO B-310372.3).

Price realism and cost estimation are one of the first hurdles that the WSARA tries to overcome by creating a "Director of Cost Assessment and Program Evaluation" which will "ensure that the budget



assumptions underlying acquisition programs are sound" (Pub. L. 111-23) (111<sup>th</sup> Cong. 155 S5205). The act provides a means for the DoD to implement department wide "policies and procedures for the conduct of cost estimation and cost analysis" for all MDAPs and further to establish "confidence levels" of these estimations (111<sup>th</sup> Cong. 155 S5205). Under the new law, contracts like the KC-X would have come under greater scrutiny for their lack of price realism analysis as Section 202(a)(1) requires that contract awards now include "adequate documentation of the rationale for the selection" (Pub. L. 111-23). The new documentation requirements as well as the establishment of confidence levels would have given the GAO a better basis to judge the accuracy of the disputed KC-X solicitation.

The current solicitation has now come into question as to whether it is "inconsistent with the WSARA" in that "it may violate the law" with a "failure to provide for trade-offs between cost, schedule and performance" (Gretler 2009). The current solicitation was released in February of 2009, three months before the WSARA came into effect which "[gave] the Pentagon room to argue that the tanker requirement is exempt from the requirements of the new law" (Gretler 2009). The WSARA puts heavy requirements on systems engineering as "critical parts to the acquisition process" which "translates customer needs into specific product requirements...provides the knowledge that weapon systems requirements are achievable...allows a product developer to identify and resolve performance and resource gaps...[and provides] information to DOD officials to make tradeoffs between requirements and resources" all of which are fundamental to improving the acquisition system (GAO-10-774). The pass/fail analysis of the new contract proposals "does not encourage 'a substantive evaluation of the comparative capabilities'" by "not [assigning] a premium to the Systems Engineering...sub-factors" (Gretler 2009). The contract evaluates the sub-factors "on an 'acceptable/unacceptable' basis" rather than "requiring some comprehensive analysis" of the systems engineering capabilities, which is "inconsistent with the principal reasons why Congress enacted the WSARA" (Gretler 2009).

The main problems identified with cost estimation are within the internal processes of review and acceptance in DoD contract awards. The KC-X solicitation has been opened, awarded, disputed, cancelled, and the reopened three times and the problems previously illustrated, unrealistic pricing, performance and scheduling inconsistencies, etc, have reoccurred under the new solicitations. In February of 2008 the KC-X solicitation was awarded for a second time to Northrop Grumman. The award was immediately protested by Boeing with the GAO under the same contentions as previously outlined. The GAO once again found "significant errors in the Air Force's technical and cost evaluation" of the award (GAO-08-991T). Specifically "the air force did not reasonably evaluate military construction costs" which include the most probable life cycle costs and "that the agency's military construction cost evaluation was flawed" (GAO-08-991T). The lack of concise and objective cost evaluation criteria and methods have led to protests and award cancellation on multiple occasions, each of which has a significant cost associated with it.

In February of 2009 the GAO authored a report on trends in bid protests which found that the protests are a significant factor to scheduling delays "a recent article relating to the...KC-X...found that at least three major Pentagon programs worth a combined \$70 billion were delayed this year due to protests filed by Boeing Co., Lockheed Martin Corp., Northrop Grumman Corp., and others" (Schwartz

2009). The report further found that two of the four main “common grounds for bid protests” included “agencies not maintaining adequate documentation” and “flaws in cost evaluation” (Schwartz 2009). The KC-X contract, now in round three, was slated for award in late 2010 but this has now been pushed back to early 2011. The newest delay happened amid an “unintentional data release” of one of the current solicitations competitor’s proprietary data by USAF officials (Hodge 2010). While the USAF denies that the release is the cause of the current delay, EADS North America stated that due to the data release “the company [won’t] rule out protesting the bid” if they do not get the award (Hodge 2010). Another bid protest on the contract which is already over budget and far behind schedule could mean more delays and potentially another cancellation.

## Scheduling

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Scheduling delays are often caused by inadequate estimations, in addition to bid protests, but the root causes can be difficult to discern. Illustrated by the Navy’s Littoral Combat Ship (LCS), the DoD Fiscal Year 2010 Budget Request Summary Justification reported that funding for “three ships at a unit cost of \$460 million each...equals the Congressional budget gap” (DoD 2010). However, in the Senate Report 111-074 – DoD Appropriations Bill, 2010, the SASC recommended decreasing funding for the Navy’s ship from \$1.38 billion to \$1.08 billion (111<sup>th</sup> Cong S. 111-074). At first this seemed to be good but further investigation shows that the original request of \$1.38 billion was for three ships at \$460 million per ship and the new request of 1.08 billion reflects the price for two ships at \$540 billion per ship. Overall this means that the original estimate which scheduled production of three ships per year had been reduced while the cost of each ship significantly increased. Neither the Senate report nor the Budget Justification offered reasoning for the increase in cost or the delays in scheduling but the report states “the committee...[is] concerned with the cost and schedule performance” of the program (111<sup>th</sup> Cong S. 111-074). Looking into the future the incremental change in the budget request could potentially extend the program out years as the production capacity estimation has decreased by roughly 33%.

The WSARA intends to fix the scheduling problems with a two pronged approach, first by “designation of senior official responsibility for performance assessments and root cause analyses” (Pub. L. 111-23). The designation will allow for greater control over “cost, schedule, and performance...relative to current metrics, including performance requirements and baseline descriptions” (Pub. L. 111-23). These factors are to be scrutinized under “the [likelihood] to result in the timely delivery of a [predetermined] level of capability to the warfighter” and then weighed against their ability to “provide superior value to alternative approaches that may be available to meet the same requirements” (Pub. L. 111-23). Secondly the WSARA Act sets forth policy for the “Consideration of Trade-offs among cost, schedule, and performance objectives” which at minimum “requires DoD Officials raise cost and schedule matters before performance objectives are established” (Section 201(a)(2)(A)). The section further provides for “establishing an objective for the overall period of time within which an initial operational capability should be delivered” (Sec 201(b)(5)). The WSARA also provides a clause for “Reassessment of Program” under subsection 2433a which allows for termination of a program “if the

program acquisition unit cost or procurement unit cost of a MDAP...increases by a percentage to or greater than the critical cost growth threshold". This section "[establishes] a presumption that any program that exceeds its original baseline by more than 50 percent will be terminated unless it can be justified...critically important from the ground up" (111<sup>th</sup> Cong. 155 S5205). Before termination of a program the "root cause of the critical cost growth" must be determined (Pub. L. 111-23). Under the new law the LCS program new budget and schedule would likely be brought into question and investigation to determine the root cause of the increasing unit costs. Then assessment of whether they had crossed the cost growth threshold will occur, at which point termination may be considered.

## Technology Maturity

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The four main factors that commonly lead to MDAP failures are heavily interrelated. Cost and schedule estimations are dependent on maturity of technology at the time of initial acquisition as well as the expectations the DoD has on performance. In March 2009 a GAO assessment of Major Weapon Programs, found that "programs are still currently developing technologies, finalizing designs, and demonstrating manufacturing processes, which can lead to cost and schedule inefficiencies and avoidable rework" (GAO-09-326SP). The report looks at the development of "system's critical technologies" in which the critical technologies fail to be demonstrated and proven to work (GAO-09-326SP). At the time of the report many programs across the uniformed services were suffering from immaturity in technology, design, and production methods. The Army's Future Combat Systems (FCS) program had only "three out of forty-four" critical technologies at a mature level (GAO-09-326SP). According to Sen. Carl Levin in a 2009 SASC hearing, "FCS [and one other program not mentioned] [accounted] for \$80 billion in cost overruns, with average unit costs that have already increased by 40%" (111<sup>th</sup> Cong. SASC 2009), mainly due to "initiating [the program] with insufficiently mature technologies" (111<sup>th</sup> Cong. SASC 2009). As of 2009 with nearly "\$200 Billion" invested in the program, FCS was said to "be closer to the beginning of development that it is to the end" with uncertainty on "when or even if...[FCS] can be built" (111<sup>th</sup> Cong. SASC 2009). FCS was cancelled due to these failures. But the same problem of immature technologies can be seen in programs that exist and are still being funded today. The LCS had a greater level of success with seventeen of twenty-five critical technologies fully mature (GAO-09-326SP). However, the design and production maturity of the program, "has proven unsuccessful" (GAO-09-326SP). The Navy selected a "concurrent design-build strategy" which postponed the production schedule as the critical technologies caused "delays in major-equipment deliveries" (GAO-09-326SP). Additionally, several of LCS's critical technology systems are currently "are struggling to reach maturity" (GAO-09-326SP).

Overall the DoD has been operating in an environment where "promised capabilities continue to be delivered later than planned" which make cost and scheduling estimation unpredictable at best. "Technology Risk", including immature technology procurement, is "probably the single most significant driver of cost growth in...weapons procurement programs" according to Sen. John McCain (111<sup>th</sup> Cong. SASC 2009). The WSARA was designed and written to include methods of preventing technology failures by incorporating "prototyping requirements for MDAPs" in Section 203 of the Acquisition Policy which not only "will reduce the use of immature technologies" but will "[allow] technologies to mature in the

tech base, rather than forcing them into acquisition programs” (111<sup>th</sup> Cong. SASC 2009). The section begins by outlining “Competitive Prototyping” by stating that “the acquisition strategy for each MDAP provides for a competitive prototype before Milestone B<sup>1</sup> in order to “[ensure] through preliminary design review that requirements are well understood” (Sec. 203(a)(1)) (111<sup>th</sup> Cong. SASC 2009). Competitive prototyping enables the DoD to “gain knowledge more quickly and to maintain competition” (111<sup>th</sup> Cong. SASC 2009). Our legislators believe that the most distinct advantage competitive prototyping will bring to the DoD is “[proving] new technologies work before trying to produce them” (111<sup>th</sup> Cong. 155 S5205). These contentions are further strengthened by the requirement in Sec. 201 that “at a minimum...the process for developing requirements is structured to enable incremental, evolutionary, or spiral acquisition approaches, including a deferral of technologies that are not yet mature and capabilities that are likely to significantly increase costs or delay production” (Pub. L. 111-23 Sec.201(a)(2)(B)).

The Act brings these functions under the two newly created oversight positions of “Director of Developmental Testing and Evaluation Systems Engineering” who shall “coordinate...to ensure that all developmental test and evaluation activities of the DoD are fully integrated and consistent with the systems engineering and development planning processes” (Pub. L. 111-23 Sec.139d). One of the primary roles of the positions is to “ensure developmental testing requirements are appropriately addressed in the translation of operational requirements into contract specifications” which is intended to ensure requirements can be met in MDAPs (Sec 139d(b)(1)(a)(i). It was acknowledged by the SASC that creating new positions adds to a “bureaucracy...[which already] is big enough” but the jobs “create and resume key oversight functions” (111<sup>th</sup> Cong. 155 S5205). These positions are intended to aid in “[assessing] each departments ability to conduct early stage systems engineering and fill in any gaps in that important capability” (111<sup>th</sup> Cong. 155 S5205). The WSARA “requires the services to develop, implement, and report on their plans for ensuring that [the positions and] functions are adequately staffed to meet the Reform Act requirements”. The directors will be required “to report to Congress on March 31 of each year on military service and MDAP systems engineering and developmental testing activities from the previous year” which will “include a discussion of the extent to which MDAPs are fulfilling their objectives...[and] provide an assessment of the department’s organization and capabilities to perform these activities” (GAO-10-774 ).

The GAO has found that overall, “the absence of wide-spread adoption of knowledge-based acquisition processes...[is a] major contributor...[to the] lack of maturity” (GAO-476SP). The WSARA intends to build in greater use of knowledge-based acquisition by requiring “the consideration of tradeoffs among cost, schedule, and performance objectives for joint military requirements in consultation with the advisors” (Pub. L. 111-23 sec201(b)(C)). Requirements will be reviewed for consideration by “the Joint Requirements Oversight Counsel” which will “take appropriate action to seek and consider input from the commanders of the combatant command” and “[engage] in consideration of trade-offs” and further “engage in consideration of issues of joint portfolio management” (sec201(c)(1),(2),&(3)). Considerations, joint input, as well as input from the combatant commanders

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<sup>1</sup> Milestone B “authorizes the program manager to move the system into ‘System Development and Demonstration’ phase” (DFAS 2001)

will help ensure that there is greater understanding of requirements and that acquisition decisions are made using a knowledge-basis.

## Changes to Programs

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The problems outlined thus far provide the basis for understanding the fourth major factor for acquisition program failures, costly changes to requirements, production quantities, and funding levels in the middle of ongoing programs. In 2008 the GAO found that “63% of the programs had changed requirements once system development began” and it was acknowledged by the DOD that “[this] statistic may be true but the conclusion reflects naivety about derived requirements, management of necessary change tradeoffs for cost, schedule and performance during system development” (GAO-08-467SP) (Finley 2008). “Program after program, [the DoD] is into full-scale development and discover...critical technologies aren’t mature enough, and so the program is delayed, and that drives the schedule, and these slippages occur”, because all of these factors are interdependent (111<sup>th</sup> Cong. SASC 2009). If a technology fails to be delivered on time it could potentially push back the production schedule, change the required quantities, or more require additional funding to speed up development. “Artificially low cost estimates, optimistic schedules and assumptions, immature design or technology” have been used as the foundations upon which acquisition programs move forward into “milestone B, the starting point for major development and manufacturing design” (111<sup>th</sup> Cong. SASC 2009). As shown by the LCS for example, the initial cost and schedule estimates were flawed causing a 33% reduction in the production schedule, which extends out the life of the acquisition program. Additionally, when program managers are faced with budget cuts that are “for financial or other reasons unrelated to performance, [the DoD] ends up putting three times what [they] cut to restore the program later and get it back to its base” (111<sup>th</sup> Cong. SASC 2009).

The WSARA addresses this first by “ensuring through preliminary design review that requirements are well understood before a program receives a Milestone B approval” (111<sup>th</sup> Cong. 155 S5205). Section 204 of the bill is targeted at programs that are already experiencing cost and schedule growth where “Actions to identify and address systemic problems in MDAPs prior to milestone B approval” are set forth. The clause requires that all programs experiencing cost growth develop an action plan “[identifying] the root cause of cost or schedule growth” and then “[identifying] appropriate acquisition performance measures for the remainder of the development of the program” (Pub. L. 111-23). The action plan must include either “certification stating that (I) the program is essential to national security, (II) there are no alternatives...at less cost, (III) new estimates of the developmental cost or schedule...are reasonable, or (IV) the management structure...is adequate to manage and control program...cost and schedule” otherwise “a plan terminating the development of the program or withdrawal” will be required (Pub. L. 111-23). The second approach of the WSARA act is to prevent future acquisition programs from incurring the problems that have been endemic to the system by requiring MDAPs have “steering boards to protect programs against the desire to add more requirements once they’ve started” (111<sup>th</sup> Cong. SASC 2009). The Act requires that all “military [departments] or Defense [agencies] concerned” provide funding and resources for “Developmental testing organizations” and “Developmental planning and systems engineering organizations” with

adequate training and personnel. The newly created organizations under each department or agency will act as the steering boards and participate in many functions throughout the acquisition process including preparation of requests, source selection, and testing and evaluation of requirements for example.

## Conclusion

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The government has sought resolve to the flaws in the acquisition system over the past 60 years. The WSARA is “the latest in a series of Congressional actions taken to strengthen the defense acquisition system” (GAO-10-774). Nonetheless it must be viewed with strict scrutiny to ensure it doesn’t suffer from the same difficulties as other federal acquisition policies. Some have failed to implement real change and others simply did not do enough to be successful, including “the Packard Commission in 1986. The Gold-Water Nichols Act of 1986, the Acquisition Streamline Act of 1994, the Clinger-Cohen Act of 1996, and the Intelligence Reform and Terrorism Prevention act of 2004 [which] all addressed improvements for our acquisition system” (Finley 2008). . It is beginning to be addressed that the Act has not incorporated the necessary clauses to influence ongoing programs such as KC-X. The question must be raised, when facing a contract that will span decades and cost taxpayers hundreds of billions of dollars, whether it should be allowed to be precluded from the standards put forth in the WSARA. The current debate has turned to consider if the Act has incorporated measures that would allow for yet another cancellation of the final solicitation award. Could the contract be cancelled on grounds of legality under the new law? Or could the act potentially provide the foundation for another bid protest by the losing party?

While the WSARA is currently receiving “praise” from congressional leaders and taxpayers alike as it is indicative of Congresses “great efforts to improve the...acquisition system...to minimize waste in the defense budget” (Lanham 2010). But the act is still in early phases and many parts of it have not yet been implemented. When the act passed, it allotted time for the development and implementation of policies, restructuring of organizations, and additions of personnel. Day-after-day defense acquisition regulation issues “Final Rules about Regulation” are coming out of the DoD. Decisions still to this day have to be made regarding major policies and implementation strategies. The WSARA did not set forth a strict time-table for implementation, but rather guidelines for development of official policies and reporting standards. After creation, ownership of the WSARA was effectively transferred to the DoD and the AT&L workforce as the “military services [who] are ultimately responsible for ensuring that their weapons systems start off with strong foundations” which is the main objective of the WSARA.

In July of 2010 the GAO authored a report to the SASC on the progress the DoD has made in implementing the WSARA. Among the findings is that “[the] DoD has made progress in implementing reform act requirements, but has not developed performance criteria to track success” (GAO-10-744). Performance indicators and measures will be the only way to objectively assess whether the WSARA will bring in the change the DoD acquisition system needed. Especially because “many of the requirements...will require ongoing efforts”, they cannot happen overnight. The act requires that incremental changes occur in systematic steps. Without the performance criteria the act potentially could be under-valued and largely ignored. The GAO has found a number of instances where the

changes being implemented are “[covering] fewer programs and [are] not as structured as those provided by the [issuing] offices” (GAO-10-744). It still is too early however to judge whether this is due to ineffective implementation or whether it is because the “necessary expertise to review and provide formal assessments of programs” are still being developed (GAO-10-744).

The latest news of federal budget cuts and the government civilian pay freeze draw concern about the “workforce and resource challenges” the military services will face in trying to effectively implement the act (GAO-10-477). One of the key issues identified by congressional research was that “over the last decade the DoD acquisition workforce has been greatly undervalued” where “there’s been a loss of a large number of the most experienced management and technical personnel without an adequate replacement pipeline” (111<sup>th</sup> Cong. SASC 2009). The SASC has acknowledges that a “revolving door” exists in the AT&L workforce “to the commercial industry” (111<sup>th</sup> Cong. SASC 2009) and the WSARA sets forth a framework to correct these problems as well. This is merely the beginning in many changes that will come down in the future months and years to try and correct the problems with government spending and fix the burgeoning budget deficit.

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## SUMMER FIELD EXPERIENCE BLOG

HELLO! MY NAME IS MATT OLSON. I AM A 22 YEAR OLD SENIOR AT WESTERN MICHIGAN UNIVERSITY. THIS BLOG WAS CREATED AS PART OF MY SUMMER FIELD EXPERIENCE CLASS FOR THE HONORS COLLEGE. IN CONJUNCTION WITH DR. BRET WAGNER, I WILL BE CONDUCTING AN INDEPENDENT STUDY OF MILITARY LOGISTICS AT MY EMPLOYER US ARMY TACOM

WEDNESDAY, AUGUST 18, 2010

### Wrapping Up The Summer

26 July

Working in the LMP office I learned a lot about organizational agility. The people who staff the office are constantly required to react to unforeseen circumstances. They have to make quick decisions with the best information that is available and ensure everything is constantly on track to meet the deadlines and goals. It is drilled into everyone's head, the program is ending, funding will be gone on go-live, and failure is not an option. I repeat failure is not an option. There is an old Army acronym SNAFU that could be used to describe what the LMP office frequently has to deal with. I will let you Google that one on your own. In my last couple weeks with LMP several employees fell ill. When the commonality between people's symptoms was noticed, it was suspected that the root cause may be the building we were working in. The decision was made to close the building and relocate the workers.

We were temporarily moved into an auditorium down the street from the original location. Approximately sixty people were set up in rows with computers. We all shared a phone line, but everyone had network access and could perform their jobs. Productivity never faltered. As I finished my week out with the education and training team I continued the helpdesk function I was performing before. In addition to this once a week I would have to review changes that were being made to the classes people had been enrolled into for education and training.

The process of enrolling employees into classes can be difficult. It begins with a person's supervisor whose job it is to identify the transactions their employees perform. Once this is done the supervisor can see what areas of the SAP software that employee is likely to use. For this purpose a person's job functions and transactions are referred to as their functional security roles or FSRs. The process of identifying the FSRs for LMP classes is called role-mapping. After a supervisor has role-mapped their employees, they load the FSRs into the user account management system. We would then download

the UAM records and use those to build the TMS database. This is a very simplistic outline of the system. How it actually works is very involved and I never personally got handled these tasks. The task I did perform was to scrub the data records that came out of UAM against TMS. I was looking for any changes or inconsistencies between the two systems. If something appeared on the UAM record but not TMS, it was a new FSR added by the supervisor and the user needed to be enrolled in the appropriate class. If something appeared on TMS but not UAM the user's role had been removed and they needed to be dropped from the class.

This sounds simple, and for the most part it is. What complicated the task was the fact that there were approximately 18,000 data records in each system, and hundreds of changes occurring weekly. There was tendency by supervisors to over role-map their employees into more FSRs than they actually perform. The logic behind this was to make the employees competent in as many areas as possible so if their job changes in the future they will already know how to perform the tasks. This situation while highly desirable is just not practical. The priority is to deliver the education and training necessary to keep the organization functioning at go-live. This generally turns out to be the minimum requirements for each student. Anything additional will come after go-live.

This week I returned to the Detroit Arsenal from Selfridge to finish out my summer with the TMDE/Special Tools Team. I have a little over two weeks here and then I am going on a special mission I volunteered for at Ft. Bragg, North Carolina. This mission is with a group called the small arms readiness evaluation teams or SARET. SARET is a mobilized group that travels to the location of an Army Unit to inspect and repair weapons like M2s (50 caliber machine gun), Mark 19s (automatic grenade launcher), mortars, and M240 (7.62mm machine gun). They will handle nearly all of the unit's arms including optics, lasers, etc. It will be a great opportunity for me to get hands-on experience in a shop setting and see a different perspective of our organization.

POSTED BY M5OLSON AT [10:39 AM](#)

### Changing Environments

12 July

Since my last post my work assignment has drastically changed. In fact, I am currently on a different assignment at a different duty location. In my last post I began talking about my education experience with LMP. After that post a few things happened. First as I continued my education classes, it became more apparent to me just how well the WMU ISM has prepared me to use ERP systems. After several

hours of web based training, I did not learn or see anything that I had not already been familiarized with in school. Second, I requested to attend a Town Hall meeting hosted by the LMP office and the command. This meeting detailed some of the implementation requirements and what is being expected of the workforce, gave the general timeline and expectations, and answered many questions and concerns that employees and supervisors at TACOM LCMC had. It became even more apparent to me then that I was well suited to work on the LMP project.

In case I have not yet mentioned it, I am currently working on my honors thesis project which is being chaired by Dr. Wagner. The project I am pursuing is a study and analysis on the critical success factors to ERP system implementation. Needless to say my project and what is currently happening at TACOM LCMC is seamlessly aligned. After going through the LMP classes and sitting in on the town hall, I decided to see what I could do to lend my efforts to the LMP project. I approached my supervisor about it and within 4 days she secured the opportunity for me to complete a 5 week developmental assignment with PM-LMP, the project manager for the logistics modernization program. My duty location is now Selfridge Air National Guard Base for the next few weeks. I am located in an office 6 feet away from the coast of Lake St. Clair. Seeing the sunrise over the water each morning is a nice way to start the day.

On my first day reporting I met my team, an enthusiastic group of people called the Education and Training Team. Our task is to get 7,000 employees at 8 different sites ready to use the LMP system by the go-live date in October. The task is monumental. One of the first pieces of advice I received here was “Be very careful with your words and how you speak. A large part of the workforce is very hesitant and resistant to what we are trying to do here. People are going to fight you on what you say and how they interpret it, so make sure you know exactly what your words mean before you use them”.

Education refers to informative instruction. This is where end users will learn what the system is, and what it can do. It walks through basic functions and features as well. Training is the hands on classroom experience that users get with the system. Each user is put into classes based on the functions of their job and they learn the skills and transactions that will enable them to complete their work.

ERP implementation in itself is a very delicate process. It needs to be done with a level of precision to ensure that all business processes can continue after the change occurs. There are several methods to implement an ERP system, one is a direct cut-over in which the old information systems are switched

off, the new one is turned on, and there is no going back. Another is to run both systems simultaneously. The latter can be very costly and lead to problems as users who do not feel comfortable with the new system or are resistant to the change will continue working in the legacy system. TACOM LCMC has selected the former, direct cut-over, as its method of implementation. The direct cut-over method has a greater level of risk involved with it but the bottom line for the LMP Implementation at TACOM LCMC is that the budget is up and it cannot fail. So there is no other way.

The Army's LMP implementation began in the early 2000s. It was planned to be implemented in 3 deployments designated D1, D2, and D3. D1 was the CECOM, communications and electronics command. D2 was AMCOM, the Army Missile Command. CECOM and AMCOM were implemented with a simultaneous deployment. To date AMCOM and CECOM are still conducting transactions in the legacy system. Data migration has not yet been complete due to inaccuracies and missing information. D3 is TACOM LCMC and the direct cut over has been chosen for several reasons. One is because the lessons learned from D1 and D2 have shown that the simultaneous deployments prolong data cleansing efforts and migration. It also has allowed many users to avoid learning the new system and continue operating in the legacy. Another reason it has been selected is because it is the final deployment. It was planned from the beginning of the project that upon the final deployment the legacy system will be shut off. Also being the final deployment, the funding for the program is now gone. All loose ends must be tied up so that the program can be marked with completion.

On the education and training team I have not been working directly with the LMP system. Rather I have been working with the training management system TMS. TMS was developed specifically for this project and has several purposes. First it notifies users of their scheduling in classes, it tracks attendance, delivers course evaluations, and knowledge assessments. As with many things in this office TMS was developed as an ad-hoc solution for problems that were occurring with delivering and monitoring training. There are bugs with the system, issues are occurring, but solutions are being developed and it is continuously refined. TMS serves its purpose very well and has helped to ease the monumental task that is training 7000 users.

I have been facilitating TMS errors and problems. I am serving as a point of contact in the office to fix and sort out several types of issues. My role is primarily diagnostics. When errors and problems occur with the end users I help walk them through the system and take corrective action. If there ends up being a problem with TMS I pass this to the appropriate person to correct, as I do not have appropriate

permission to make changes to user accounts. Nine times out of ten errors occur with the end user. Generally it is a lack of full understanding or a failure to correctly follow the instructions they were provided. In this respect I have taken on the functions of the call center/help desk support.

POSTED BY M5OLSON AT [10:38 AM](#)

### Training Requirements

28 June

Since my last post there were several developments with the M-ATV project. The first thing my group learned was that we were being a little too preemptive with the issue. Normally when we begin to review a tool load, it is from an output known as the Special Tool and Test Equipment List (STTEL). This output is something that is normally built into the contract with the original equipment manufacturer (OEM) and is given to our group to sign off on. The development that put this project on hold from our groups end is that M-ATV is not a “new” vehicle. It already exists in the Army inventory and it is being supported organically. What is “new” about it is that the support for the vehicles is currently being done with commercial-off-the-shelf (COTS) technical manuals, so the Army is in the process of developing the military standard (MIL-STD) Army manuals for the vehicle.

As such our group never received the STTEL in the manner usually done with new procurements. Instead the review that I was doing was from the organic technical manuals. The MRAP PSID which owns the vehicle and is doing all the work involved with replacing the COTS has been very proactive with their writing and review of the tool list and the TM in general. In a recent meeting with the group, my colleagues were happy to learn that MRAP has been fully compliant with the new changes that have been put into the MIL-STD and is not requiring the guidance that the Tools/TMDE group generally provides.

There is a lot of training involved in my job here at TACOM LCMC. Every year the command issues mandatory training that is essential for all of the work force to complete, in addition to this, when I begin my career after graduation I will be placed into a 3 year intern program. This program is designed to be a combination of on-the-job training and classroom training that fully prepares recent graduates for civilian military logistics service. Some of the classes I will take will give me an extensive working knowledge of automotive systems, provisioning or adding new items to the army’s procurement databases, maintenance systems and programs, etc.

Right now there is ongoing training to prepare the workforce for the ERP Implementation known as the Logistics Modernization Program (LMP). The TACOM LCMC implementation is the last and largest in the LMP deployment and at its end it will prepare 7,000 employees at 8 different national sites to use the SAP software. I recently received my training requirements and it is to include 3 web-based classes as well as 5 instructor-led classes.

The web based classes were designed to give users a basic understanding LMP and navigating the SAP software. For any WMU student reading this, if you have ever doubted what Dr. Wagner teaches in MGMT 3200 this is proof that he is going above and beyond to prepare you for the future of supply chain management. The web based training classes were a breeze. They basically teach a lot of what you learn in BUS 2700. After completing them I really feel that I have a competitive edge coming into employment here. The skills we all learn in 3200 are what TACOM is teaching to their “Material Master Cell”. These are the people who control the data that you see in the system including the MRP, BOMs, Procurement data, etc. The next classes I have scheduled cover provisioning, and item interchangeability and substitutability.

POSTED BY M5OLSON AT [10:36 AM](#)

### [Logistics Integration and Lifecycle Support](#)

14 June 2010

To continue the discussion of the Army’s concern with after-sale logistics, I would like to use a task I have recently received to further explain the depth and importance of the logistics functions. In my earlier explanation of my role within TACOM LCMC I had mentioned that I am working with special tools, TMDE, and matrixed to PM-SKOT (Project Manager for Sets, Kits, Outfits, and Tools). The tasks that I received is to scrub the Tool and Test Equipment List (TTEL) developed for the draft technical manual (TM) of the M-ATV (MRAP All Terrain Vehicle (MRAP meaning Mine Resistant Ambush Protected vehicle)).

I must take a few steps back to explain what a TTEL is and why it may need to be “scrubbed”. It will require a little more background about the army to fully understand, so I will start there. Currently there are approximately 250,000 individuals in the US Military Forces deployed in approximately 130 countries. US ARMY FORSCOM represents most of the public’s view of the Army as they are the soldiers, the frontline operatives who put the mission and plans into action. To do so however requires the inputs of many different commands within the Army; vehicles and armaments from TACOM, training

from CASCOM, communications from CECOM, for example.

TACOM has developed into the Life Cycle Management Command. Taking a product from development, to sustainment, all the way to disposal takes a lot of planning, training, and instruction. Using the new school of thought, business students are taught that an efficient business must focus on its core competencies to truly thrive. The Army is no different, and this school of thought is what has led to the development of the LCMC. At one time the Army controlled the majority of new product development (NPD) and production. Looking at the larger picture however, NPD really represents a very small part in the life of the equipment. It is not the Army's main concern to crank out the best vehicle systems or the most lethal weapons and so a lot of that is left to product developers and defense contractors. We instead focus on the entire life cycle of the products we deploy. The core competencies of the Army are 1) training and equipping soldiers and growing leaders, and 2) providing relevant and ready land-power capability to the Combatant Commanders as part of the Joint Force.

Now I don't want my previous statements to seem inconsistent with what everyone knows about American Military Forces. We are the most lethal and we have the best vehicle systems and equipment in the world. So just how is that gap bridged between the core competencies and the best technology? When a material need arises under one of these two competencies the Army will usually solicit design ideas, RFQs, and RFPs from contractors. The Army will then select the contractor based on technology, capability, and price. The lower the value an item has, a greater emphasis usually falls on price. Once the Army identifies and selects the source of supply, the contractors immediately go to work on producing the item and we here at TACOM LCMC immediately go to work on developing Integrated Logistics Support (ILS) for that item.

Let's look at my M-ATV task as an example of this process. After the 2003 invasion of Iraq, a need arose under one of the Army's core competencies. The problem: the most prevalent ground vehicle within the Army, HMMWV, could not withstand the unforeseen use of deadly improvised explosive devices (IEDs). It was seen within the core competencies that HMMWV was not relevant to this war. They were developed in the late 1970s and early 1980s before anyone imagined the use of IEDs. Therefore the need for a new vehicle system that would increase the survivability and protection of the soldier from IEDs arose. This supports the second core competency by increasing the relevance and readiness of the military's land power. After identifying a need, the army will set forth its requirements and in this instance it was MRAP, the Mine Resistant Ambush Protected Vehicle.



So what about M-ATV? Well last year the Army entered a period of transition from Operation Iraqi Freedom (OIF) to Operation Enduring Freedom (OEF, the front in Afghanistan). Once again a material need arose under the Army's core competencies. The problem: while the requirements of MRAP are still necessary, the vehicles developed were done with the flat Iraqi terrain in mind. MRAP does not have the capability needed to traverse the mountainous Afghan terrain in the most effective way possible. Therefore the need is for a MRAP vehicle that will contribute to the readiness and increase the mobility of our warfighters. Make way for M-ATV, the MRAP-All Terrain Vehicle

The focus of TACOM is once again to manage an item throughout its entire life. Due to the nature of war TACOM LCMC often puts immediate needs on our suppliers. The goal is to get what is required out to the soldier in the field as fast as possible, without compromising quality. It is possible to shorten new product development and to push new equipment quicker because our suppliers have learned to compete on just that. Developing life cycle logistics on the other hand takes a lot of planning, training, and coordination. The process also falls under the Army's core competencies. So often times TACOM LCMC will field new equipment with a period of Contractor Logistics Support (CLS). This in my mind equates to a period of warranty in which the contractor will manage sustainment of the equipment until TACOM LCMC develops internal Integrated Logistics Support (ILS) for the item.

For a vehicle such as M-ATV, ILS includes training the soldier to fully disassemble, diagnose, repair, recover, overhaul, then finally reassemble the vehicle so that it is fully mission capable. This process is complex and requires many tools. Anyone who has ever worked on an automobile is familiar with common mechanics tools. They are standard at any tool store, standard sizes, Society of Automotive Engineer (SAE) approved and compliant. For the most part these tools will suffice for any weekend garage-mechanic. TACOM LCMC and specifically PM-SKOT have taken these standard, common tools and put them into sets, kits, or outfits (SKOs) that make it easy to find, identify, and inventory instantly. The SKOs contain standard tool and test equipment that is preauthorized for army use. The Standard Automotive Tool Set (SATS) for instance contains seemingly every tool under the sun in an 8'x8'x20' box. These common sets will support common tasks but true ILS requires more than that.

When a new vehicle system is coming on line or transitioning from CLS to organic (in-house) support there are many steps to insure efficient ILS systems are in place. One of the first steps required is performing a Level of Repair Analysis (LORA). LORA identifies every major component, sub-systems,

and assemblies that could potentially require repair, replacement or overhaul throughout the life of the vehicle. LORA looks at the costs associated with the repair, from material requirements, to personnel needs, as well as non-monetary requirements such as training and facilities required. The output of the analysis is first whether it is cost effective or even practical to repair the item, and second what level the item will be repaired at. Examples of levels of repair are field, by the soldier; sustainment, such as Army depots and national maintenance programs; or contractor (3rd party) repair. Once the LORA is complete, the Army can identify the training and resources that a soldier will need at field and sustainment level to support the vehicle. The vehicle in effect becomes a product of the individual maintenance tasks it takes to ensure readiness and full mission capability.

Back to my task: Scrubbing the M-ATV tool list. The LORA has been performed, the field maintenance tasks are identified, and it is now time to develop the material requirements to perform the maintenance tasks in the field. For the majority of common tasks, common tools will suffice. There is not much difference throughout vehicle platforms when removing a starter, or changing a break pad, for example. But there are more complex tasks which are unique to individual vehicles that require special tools. M-ATV has a commercial (not military specification) Caterpillar engine, and an Allison transmission. Normally when CAT or Allison sells their engines and transmissions in the commercial world, they do so making the assumption that the end user will not be the one performing the maintenance and service. In fact, many original equipment manufacturers (OEMs) make a lot of money on selling service and dealership maintenance. Servicing this equipment requires unique tools that can be very expensive for many commercial users when only procuring 1 or 2 vehicles. But in the case of M-ATV, the Army is buying over 2,200. So buying the special tools required for service becomes more than just practical, it becomes necessary for efficient sustainment and support.

Here on the TMDE/Special Tools team we were provided with a draft Tool and Test Equipment List (TTEL) from the M-ATV group. This lists all the special tools and test, measure, diagnostic equipment (TMDE) that has been identified (usually by the OEM) and will be required to support the vehicle. The TTEL also lists which Army sets, kits, or outfits (SKOs) have been authorized for use on the system. My job has been to go through this list and identify the tools. The goal of the task is to utilize standard Army tool and test equipment whenever possible. This helps to minimize procurement and ensure that field units are not continually provided with duplicate tools.

First I verify that the stock number and part number exist, are valid, and are approved for Army

procurement. Next I have to identify the form, fit, and function of the tool. This takes reference into several Army databases, comparison against dealer parts and service catalogs, and sometimes phone calls to the OEMs or authorized sources of supply to retrieve the necessary specifications. Then I have to compare the information I have assembled against data we have on the authorized Army SKOs. If a tool in the Army SKOs can provide the same form, fit, and function as the tool on the TTEL, it is not a special tool and is marked for removal from the list. If a piece of TMDE cannot be found in an authorized Army SKO, then we reference a Preferred Item List (PIL) to identify a source of supply. Often time exact comparisons between the draft TTEL and the Army SKOs do not exist. In this instance we can make our best recommendation or request more information from the appropriate equipment specialists or contractors. The ultimate goal is to draw down the list as much as possible and identify most efficient means of support.

When this task is complete our job is mostly done until the vehicle system is ready for verification and the logistics demonstration. Verification and log demo is the final test in the development of ILS. TACOMs work is handed over to the soldiers to verify that the maintenance tasks and support can be performed by the soldier in the exact way, with the exact tools, as they were developed. The TMDE/Special Tools team will attend to oversee the use of the tools and diagnostic equipment. There are many problems that can arise during the log demo, but ideally if there are no problems with the special tools then my team leader will sign off on the material release and our task is complete.

POSTED BY M5OLSON AT [10:34 AM 0 COMMENTS](#)

FRIDAY, AUGUST 13, 2010

### [The Army Material Command](#)

I found a video the other day that may help put everything into perspective. This was released on the Army Material Command's (AMC) web site. It talks about AMC's function and the subordinate commands that fall under it (TACOM LCMC being one). Check it out below. I am not sure if the hyper link will work so just paste it into your address bar if it doesn't open.

<http://www.amc.army.mil/pa/about.asp>

POSTED BY M5OLSON AT [10:50 AM 0 COMMENTS](#)

WEDNESDAY, JUNE 9, 2010

A Greater Look at Military Logistics

June 2010

In the previous weeks I have continued much of my work at Selfridge ANG base with contractors. To better explain the purpose of our team's visits to this site it is necessary to clarify the Army's take on logistics as opposed to logistics in the commercial realm. The traditional teaching of logistics encompasses all of the functions, business processes, and activities involved in getting a product or service to the end user or customer. This can include the movement of raw materials to production of major and component parts, then to final assembly, and distribution channels. Logistics can also go further and consider after-sale warranties and service, although nearly all firms will disclaim and limit the warranties thus ending the after-sale logistics functions.

The Army on the other hand places much greater emphasis on the after-sale logistics functions. When the Army procures an item, the item enters the Army Supply System. TACOM LCMC functions as an intermediary between the manufacturers of goods, and the end-user (here being the soldier). The acronym LCMC, meaning Life Cycle Management Command, does justice to TACOM's concern with the after-sale logistics activities. Once an item is in the supply system it could be there for 50+ years and TACOM LCMC's function becomes sustainment. Take for example the HMMWV (High Mobility Multi Wheeled Vehicle) aka Humvee aka Hummer (although no one on the military side will say Hummer as it usually refers to something procured on a street corner, not a military vehicle).

The HMMWVs entered the supply system in the 1980s and have been a cornerstone of military mobilization and operations ever since. During the time since initial procurement, TACOM LCMC has had to constantly manage this major item, and the secondary items that make up the entire package. Our job is to make sure all items are continually available and fully mission capable. This includes frequent repair, overhaul of major sub-systems (engines, transmissions), general maintenance, etc. The Army must also stock all things necessary to maintain these items, including any special tools required to service the vehicles, which is one of the areas I am involved in. Just how far back do these managed items go? Well the other week for example while conducting analysis of special tool functions for our group's item managers I came across tools for REO and Studebaker trucks produced in 1942,

that are still being managed. So the logistics function for TACOM LCMC is the movement, inventory, and sustainment of all equipment and parts necessary to use and maintain the equipment, for the life of it or until demilitarization; cradle to grave.

Getting back on track, the initial purpose of this post was to explain what I have been doing at Selfridge. Knowing a little more about TACOM LCMC should help you understand the Army's need for Test, Measure, and Diagnostic Equipment (TMDE) necessary to maintain the vehicles in the supply system. When problems occur with the vehicles the first step in fixing it is figuring out what is wrong. This typically requires interfacing the vehicle with a computer which will run tests and pull error codes off of the vehicle's on-board computer. This is common practice at any commercial vehicle service station. What is different here is the military specifications for the hardware, software, and the technology being deployed. On site at Selfridge we are testing new hardware and software that will greatly improve the ease-of-use as well as fix several problems that were present in the TMDE currently in the field.

One thing we are not however is the product developers or engineers. We do not understand the software code or circuitry that makes this equipment run. So in that aspect our involvement on site is limited, and those functions are represented by the contractors. But it takes many eyes and ears to get the product right and make sure all of the bugs are worked out. Normally in new product development engineers and product developers alike are able to interact with the customer. They can easily receive feedback and highly valued input of the end-user. However, when developing military systems this is not always practical or possible. Our end user is often deployed thousands of miles away from the developer or contracting agency. This creates a challenging gap in the feedback loop. We come in to fill this gap. In facilitating testing, we represent the soldier to ensure the best product is the one that makes it to the field.

We are on site representing more of the end-user perspective in the development of the equipment. We are there to raise red flags, ask questions, and inform the contractors when they can or cannot write the software in a specific way, or in a way that is consistent with the technical manuals and procedures that are already in place. We are there as people who know the vehicles and the end-users, and in my colleague's case have extensive backgrounds in vehicle maintenance which makes them experts in the diagnostic processes. My personal involvement is to gain access to the TMDE equipment, have the opportunities to see it being used, to use it, and to learn it. Being part of any team as an

equipment specialist requires a wealth of knowledge of the product you support. I have merely scratched the surface.

POSTED BY M5OLSON AT [6:38 AM](#)

TUESDAY, JUNE 1, 2010

### [First Week Back](#)

17 May 2010

I began my summer back at TACOM LCMC with great enthusiasm. Over the course of the school year I began to get anxious to return to my job. Working here can make people take a different level of pride in their work because the bottom line isn't always dollars and cents, but rather life and the soldiers well being. It is possible to feel lost at sea among the thousands of people working here. But I realized my significance last summer when I received a personal email from a soldier in the field stating that I had made a difference in his job in the theater of war.

I had kept in contact with my supervisor over the semester and knew I would begin my summer placed on a new team. Every team here plays a vital role in a much larger picture. During my first year on the job at TACOM LCMC I was involved in fire suppression systems. My role is now transitioning to TMDE (test, measure, and diagnostic equipment) and special tools. I work within the ILSC, Integrated Logistics Support Command. Within the ILSC exist PSIDs, product support integration directorates; I work for the Tools PSID. The PSIDs are matrixed to PMs and PDs (product managers and product developers). The team I am now supporting is connected to PM-SKOT (Sets, kits, outfits, and tools) and PD-TMDE.

Assignments were waiting for me upon my return. I began the week assessing the functionality of special tools that exist within the sets and kits that my group supports. The process can be long and involved. It requires research into multiple databases to identify the tool and its end item, then searching technical manuals and maintenance orders for the functionality. The task is being done in support of our PSID item managers who need the information for their monthly studies.

Scouring the databases is a long task as stated, but TACOM LCMC is currently undergoing ERP implementation which will ease these types of information searches. The Logistics Modernization

Program (LMP) is one of the largest ERP implementations being done by any organization, government or private. Over the course of the summer I will be involved in several end-user LMP classes to learn and understand the Army's version of SAP ERP software. I will also be looking into the implementation strategies being used as part of my honors thesis.

The team I am working on frequently has field assignments with local area contractors. This past week I was invited to go out on such an assignment. We met at Selfridge Air Base with a contractor who is currently developing vehicle diagnostic equipment. Here we allowed them access to vehicle platforms and facilitated testing in the final phases of the new product development cycle.

POSTED BY M5OLSON AT [11:10 AM](#)



Internship Report

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United States Army TACOM LCMC

Summer 2010





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## Overview and Description of Organization

TACOM Life Cycle Management Command is one of the organizations housed underneath the Army Materials Command or AMC. TACOM generates, provides and sustains mobility, lethality, and survivability for soldiers, other U.S. Army services, and our allies, all to ensure Army readiness today, tomorrow, and beyond. TACOM’s military and civilian associates find and implement technology and logistics solutions for the soldier. From tank-automotive and armaments weapon systems research and development through retirement, TACOM’s associates provide cradle-to-grave support to Americas armed forces. The organization is divided into program executive offices (PEOs), sub divided into program management offices (PMOs) and product support integration directorates (PSIDs). The PMOs are in charge of new product development and any projects that will update or change existing products. The PMOs are also the entities that sell equipment to the soldier in the field. Once the equipment is fielded the PSIDs are tasked with providing the lifecycle and logistics support of the product. This includes training, development of technical manuals, providing repair parts and special tools, maintenance, etc.

TACOM LCMC employs over 12,000 people at sites all across the world. It is headquarter at the Detroit Arsenal in Warren, MI which employs over 6000 people and is currently expanding. Other significant sites include Rock Island Arsenal in Illinois, Natick Massachusetts, Sierra Army Depot in Nevada, Red River Army Depot in Texas, and Anniston Army Depot in Alabama.





TACOM LCMCs customer is first and foremost the soldier. A portion of our work also goes to foreign military sales.

## Description of the Position

I am serving in a student developmental position that will lead to a GS-1670 Equipment Specialist position upon graduation. The 1670 job series description says the job involves supervision or performance of work that requires primarily and intensive, practical knowledge of equipment and its characteristics, properties, and uses in order to (1) collect, analyze, interpret, and provide specialized information about equipment together with related advice to those who design, test, produce, procure, supply, operate, repair, or dispose of equipment; (2) identify and recommend practical solutions to engineering design and manufacturing defects and recommend use of substitute testing or support equipment when equipment requested is unavailable; or (3) develop, install, inspect, or revise equipment maintenance programs and techniques.

The position requires that I become a subject matter expert on the systems I work with which in this case is test measure diagnostic equipment and special tools. As such a lot of my work has been learning these systems, how they are used and developed. I have assisted and shadowed other members of my team, and been delegated some of their (or portions of) tasks and duties. TMDE and special tools in military vehicle systems is generally a part of new product development. We serve in an advisory role when a new vehicle system is going through logistics verification. Logistics verification is a process at the end of new product development before fielding that ensures the soldiers will be able to support the maintenances and operation of the vehicle. One of the projects I worked on this summer was to review a draft tool and test equipment list (TTEL) for the new M-ATV vehicle system. I had to identify all the tools on the list by form, fit and function. Then I had to compare all the tools on the list to tools contained in the common tool sets that have been authorized for use. I provided consolidation, comments, and recommendations. Logistics verification requires that soldiers perform all maintenances tasks as they were written. I attended this event to observe the tasks and the use of the special tools and test equipment. I provided my recommendations for the task here to see if the revisions I suggested could be incorporated. When then could not I would mark these items for authorization as special tools.

This summer I was delegated the responsibility of hand receipt holder for my organization. This delegation makes me responsible for the issues, transfer, and accountability of all computers and office equipment our group owns. My group is currently in a transitional phase where many employees are transferring physical location from the Rock Island Arsenal to here at Warren. Throughout the summer I have had to draw up documentation for all issues and transfers. This resulted in a project this summer that required inventorying all equipment that is currently located here.

Another responsibility I had this summer was to serve as helpdesk support for TACOMS ERP implementation because of my familiarity with SAP software. I provided support and guidance for users that could not access the training management system (TMS). I performed data analysis on training scheduling. I assisted users with scheduling changes. I developed user guides and walk-through documents on accessing the system. I also helped users diagnose system errors and either provided support when it was an end user error, or elevate the problem to the proper channels.

I attended organizational meetings on a bi-weekly basis. The Tools PSID at the Warren site would meet to briefly discuss current projects, assignments, and temporary duty of coworkers. Team meetings were held frequently but never really planned. I was requested to sit on the M-ATVs IPT meetings to gather information about special tools and test equipment for my team leader. My involvement here was mostly observance and note taking. For part of the summer while on a developmental assignment, I would attend project management meetings to review the current progress and level of completion in the steps of the project. In this meeting I would report on my current progress with the task I had been delegated.

The most enjoyable part of my job is the level of interaction with my coworkers and the customers. This is a team oriented environment and it is even reflected in the way the office space is set up. All members of my team are located in an open environment. This has allowed me to be brought into the middle of any current issues and discussions that pertain to the equipment we support. It has worked to drastically increase my knowledge of the products and it brings me closer to becoming a subject matter expert. The least enjoyable part of my experience at TACOM overall did not occur this summer. Rather it was my job placement and my former team leader last summer. This person did not help me gain any relevant experience. Instead he used my time to perform administrative and secretarial tasks for him. This person would strip my name off of any relevant work that I did perform and call it his own. Because of all of this however, I requested to be moved to a different team which is where I have been working this summer. Over would rate my experience outstanding and recommend this opportunity to all HCoB students.

## Relationship to Education

My education in the ISM program did a very good job preparing me for this experience. Unfortunately I feel that I am somewhat over qualified. The ISM curriculum is so comprehensive that I feel I have developed many skills that are either underutilized or not being used that well. I have attempted to address this on several occasions with my supervisor. Unfortunately when I am only here for a short time, it is hard to get me involved in projects and assignments that really do justice to my education. One thing I did over this summer is get involved in the ERP implementation. I specifically requested to work on this because of the experience I already had with SAP. Although even here, I did not get to utilize the skills that MGMT 3200 builds. I believe that this is in part due to the fact that the ERP solution is in implementation and not already in place. Once the organization hits go-live WMU students will be very well prepared to come into this organization and perform the transactions that are necessary to the different supply jobs.

The IME classes have been very helpful at work. Understanding the mechanical systems and manufacturing processes has set me apart from many of the young interns and employees here. While we are not a manufacturing firm here on site, many of older employees come from this type of work. Being able to talk about materials, processes, and systems has really lowered the learning curve for me. One of the least helpful courses was manufacturing logistics. I attribute this to the fact that we are not a manufacturing firm. However I work for the integrated logistics support command. I think it would be useful if logistics was addressed in the ISM curriculum in more ways than strictly manufacturing. Before coming into TACOM I had never heard of the concept of lifecycle logistics. Even though this concept is heavily military based, I believe that it can be translated into other arenas as well.

I think that some experience with project management would be a useful skill for this job. There seems to be a very systematic way to developing and executing projects that is not military specific. TACOM uses the skills that are taught by the Project Management Institute or PMI/PMBOK. I would not say that my future plans have really changed due to my intern experience. I am planning on attending law school, but this is not a recent development in my life. I have planned on this since prior to starting my undergraduate degree.

## MINORITY SUPPLIER DEVELOPMENT

A minority owned business in the broad sense has come to mean any business that is owned or controlled by racial or ethnic minorities. More specifically the United States Federal Government as well as all fifty state governments provides rules and regulations for registration and certification as a Minority Business Enterprise (MBE). The certification states that a MBE must be a for-profit enterprise regardless of size, which is located in the US or its territories, is owned, operated and controlled by minority group members. Certifications include Minority Business Enterprise (MBE), Women Business Enterprise (WBE), and Disadvantaged Business Enterprise (DBE) for socially and economically disadvantaged persons. Michigan specifically recognizes DBE as all encompassing and only issues this certification. Members are defined as United States citizens who are at least 25% of one of the following: Asian, Black, Hispanic, Native American, and Women. The 25% minority must be able to be documented. Ownership is defined as the business is at least 51% owned by such individuals, or for publicly held companies that 51% or more of the stock is owned by such individuals. Management and daily operations must be controlled by those minority group members as well.

Sources of information on minority suppliers are vast and abundant. There is the Minority Business Development Association (MBDA) which is a part of the large Small Business Association (SBA) ran by the federal government. The MBDA provides many development services to Minority Business Entrepreneurs including Business planning tools and solutions, peer networking, contract bidding services, financial services, and working capital services. MBDA also provides registration to these entities and offers free membership to anyone interested in developing or partnering with a MBE. The association runs many local Minority Business Opportunity Centers (MBOCs) around the country that provide one stop brokering services that facilitate contract and financial transactions. The Phoenix Opportunity Matching System is a resource which businesses (minority or non-minority based) can register with. The system develops a company compatibility profile and will present a firm with opportunities to expand its supply base into the minority sector. All across the country local groups frequently host Business-to-Business (B2B) linkage forums. These forums revolve around major procurement opportunities. They also offer capacity building resources for firms looking to compete in specific projects or industries.

Presently there have been high levels of growth in the MBE sector. The United States Census collects data periodically to develop a clear picture of the business climate at large and specifically for minority businesses. The latest studies have suggested that in 2002 minority business enterprises represented 18% of all classifiable firms (classifiable encompassing minority and non-minority owned firms). The same year the census found that there was currently 4.1 million minority owned businesses in the United States and its territories with \$669 billion in annual gross receipts. Between 1997 and 2002 MBE ownership increased receipts by 35% and accounted for 5% of the increase in the workforce. At the same time, non-minority businesses decreased total receipts by 6%. The largest growth by demographic has been seen in native Hawaiian or Pacific Islander owned MBEs, followed by African American.

MBEs have created over 4.7 million jobs and they range from small/micro operations to rapidly growing technology companies, although 95% of MBEs are represented by small businesses. Large MBEs with receipts over \$500,000 consistently show strong and improving performance. The industries best represented by MBEs are “other services” at 16.4%, health care and social assistance at 14%, and professional scientific and technical services at 10.6% These MBEs have proved to provide steady jobs and generate wealth in minority communities.

There still currently exists what is referred to the minority parity. This refers to the inequality of MBE representation in industry relative to the minority population of the United States. This suggests that there should be an equal percentage of minority owned businesses as there is a percentage of minority population. While the gap is being bridged, the parity still exists. Currently 2.4 million minority owned firms would have to be added to bridge that gap. Asian Americans are the only group that has overcome that to date. Currently Asian Americans represent 4.5% of the total U.S. population and hold 4.9% of classifiable firms.

MBEs face many challenges in the United States as well as the global market place. Unequal access to capital, human resources talents, and corporate customers plague many of the industries. Many people and corporations alike are often misconstrued about minority businesses. This has lead many corporations to overlook the potential for inclusion of MBEs in their supply chains. Many people think of minority businesses as serving purely niche markets. People think of them as “mom and pop”, businesses with lack of vision, undercapitalized, having entrepreneurs with limited ambition and lack of sophisticated business skills. The general assumption is that MBEs concentrated on Business-to-customer segments focusing on minority niche markets. The truth is however that industry concentration is varied and ranges from retailing to professional services to manufacturing, and other knowledge intensive segments.

While stricken with stigmas and other disadvantages, MBE's do have some promising advantages as well. These include minorities increasing market share and buying power. Many MBE's have doubled their growth rates compared to all other non-minority firms. The number of minorities with MBA's has increased over 300% since 1977. There is a greater focus on b2b segments and supply chain involvement. Minority entrepreneurs are widely seen as having world class practices and greater levels of courage. Their corporate cultures often include reinforcing incentive systems that align employees with incentives of the business. . Hurdles that still must be overcome include access to capital for growth expansion, new ventures, working capital financing, attracting world class managerial talent and growth in b2b environment.

One example of a MBE that has a purely minority niche market as its strategic advantage is Mundo Communication Network Services Inc. Mundo is a Hispanic-owned MBE that sells discount prepaid phone cards to Hispanic migrant workers and immigrants along the west coast. Mundo's entrepreneur started his business with the idea to help link migrants to their relatives in Latin America. He targets Hispanic owned grocery store chains patronized by migrants and immigrant families.



Garry Struthers Associates is a leading MBE in the professional and technical services sector. They provide integrated management services such as engineering, environmental, facilities, and construction management services to both the public and private sectors on the west coast. His practices are cutting edge and as such he wins many contracts solely based on merit. All of his facilities and practices are ISO 9000 and ISO 14000 compliant and certified. Mr. Struthers is a long term officer of the National Minority Business Commission (NMBC). He is the recipient of many minority business awards including the Minority Business of the year award in 2000.

The federal government, and in particular Small Business Administration (SBA), has established public laws, regulations and requirements throughout history to support DBEs. I was surprised to learn that there is a mandated order of precedence when selecting a source of supply for any government solicitations. If it is determined that a mandatory government source of supply will not be used, then the order of precedence is as follows:8(a) Programs

1. HUBzone Set-aside
2. HUBZone Sole Source
3. Service Disabled Veteran Set-Aside
4. Service Disabled Veteran Sole Source
5. Total Small Business
6. Partial Small Business
7. Full and Open Competition

The mandatory sources of supply are generally internal government entities such as the General Services Administration (GSA), Federal Prison Industries (FPI), etc. So even when these mandatory sources are required, following this logic through the supply chain, the next tier of suppliers will still be subjected the SBAs order of precedence in source selection. In reality the use of minority and disadvantaged businesses is an integral part of government contract administration and department of defense manufacturing.

8(a) programs refers to section 8(a) of the Small Business Act (15 U.S.C. 637(a)), and it is covered by subpart 19.8 of the Federal Acquisition Regulations. 8(a) establishes a federal minority business development program in which the government will help establish and support minority businesses until they become viable in the competitive market place. 8(a) covers people who are socially or economically disadvantaged. It specifically covers race, gender, and handicap, but 8(a) also allows any person who feels they are disadvantaged under strict definitions put forth in the document to apply for the 8(a) programs as well. This makes it possible for people who are disadvantaged due things such as religious affiliation or sexual identity to apply for 8(a) programs as well even though they are not specifically covered in the document.

HUBzone refers to a historically underutilized business zone. These zones must meet criteria of being under populated, difficult to develop areas, qualifying county, qualifying Indian reservation, or a former military base closed under BRAC. The SBA maintains a map of the HUBzone area's in the country and gives preference for contracts to businesses that are owned and operated in these areas. Set-asides

are statistical figures that are developed periodically to determine what amount of business and contracts will be given to these types of entities. Sole sourced refers to businesses who are in the first 5 years of the SBA programs in which the government agrees to either sole-source to the business or have an output contract which obligates the government to purchase the businesses entire output.

All contracting and purchasing done at TACOM falls under the FAR and also the SBA and has to meet the requirements, targets, and mandates put forth by the federal government for small and disadvantaged businesses. In FY 2007 the department of defense negotiated a goal for small business subcontracting of 35% of its total budget. Congress also mandated a 5% requirement for small disadvantaged businesses, 5% for woman owned businesses, 3% for HUBZone, 3% for service disabled veteran owned businesses, and 3% for veteran owned businesses. This makes a total of 54% of the department of defense budget that goes to small and disadvantaged businesses. At TACOM a large amount of are purchases are from government mandates organizations, especially the Defense Logistics Agency, and GSA which must adhere to the above requirements. TACOM contracts with the an association for the blind to run all of our snack and convenience shops on base. And a good deal of the custodial work is performed by Americans with disabilities.

TACOM has several other programs of interest set up for Minority and Disadvantaged suppliers. Three specific offices here manage these programs, one is the Competition Management Office, the Small Business Administration and Office of Small Business Programs, and our Industrial Base Operations Directorate (IBO) office, each on serves different mission. The IBO is an interesting entity and serves several purposes. The first is the Arsenal Support Program Initiative. This program tends to be larger in times of peace. What it is set up to do is offer commercial use of idle military facilities. The Army leases space at very competitive rates and will retrofit buildings for the potential customers use. The most interesting program they have set up is the Diminishing Manufacturing Sources and Material Shortages (DMSMS). DMSMS is set up to ensure that small and disadvantaged manufacturing organizations stay in business. They are specialized suppliers of military hardware in niche markets. The army constantly places orders with these suppliers even when it has no requirements from them. This is to ensure that if strategic requirements arise in time of war, a source of supply will be immediately available.

On the main federal level, above TACOM, the government has set up a program known as the National Defense Industrial Association (NDIA). This program is in place to ensure that all vendors have fair access to information on new and open government solicitations. Further, it supports small businesses and vendors who are trying to get the word out about their capabilities. The organization maintains a list of businesses with descriptions of their operations and capabilities so that entities within the supply chain can see approved and competent vendors. The NDIA also provides training and business integration services that will teach organizations how to compete within the defense industry. They give introductory and more advanced tutorials on designing and building weapons systems. NDIA also has an advocacy program called Women in Defense (WID) that provides scholarships and professional developmental opportunities for women who want to get into the defense industry.

In my time at TACOM I have worked with a minority owned business, but did not know this until recently. The company XMCO provides integrated logistics services to TACOM. They are a Native American Owned DBE. They provide contracting services to develop military specification technical publications. I have asked several people at TACOM who are involved with XMCO about their DBE status. As far as I have found none of the people I spoke with were aware of this status. In this instance it has led me to believe that XMCO was selected based on their exceptional capabilities rather than a minority supplier development program. From my experience working with XMCO is they are truly an industry leader.

## Military Use of Identification Technologies

As with many business processes technology is dramatically changing inventory management in industry today. Computers and microchips are at the forefront of improving material handling, item identification and locating techniques. The introduction of bar coding and radio frequency interface devices has spawned these improvements. Bar coding is a practice that first became widely accepted when the Federal Trade Commission announced the UPC or Universal Product Code.

One of the most important initial uses of this type of technology was in tracking and identifying monetary checks. The FTC approved the use of magnetic ink and special characters along the bottom of checks for routing numbers. This was the first conceptualization of the idea of item unique identification or IUID, which is widely used in the military today.

IUID is becoming a common practice in the army because it possesses several benefits over standard bar coding. A standard bar code is known to be one dimensional because of the manner in which they are printed and read. Standard bar codes represent a linear series of numbers and contain one line of information. Unlike IUIDs, UPCs contain logic behind the series of white and black lines and spaces which makes them human readable and possible to decode. This is prohibitive when it comes to identifying multiple items. Standard bar codes are useful when trying to identify a class or bulk of goods. To further elaborate, the limitations to standard bar codes prevent individualized identification. The problem is in the linear nature of bar codes in which adding additional information to them makes them longer.



IUIDs were developed to solve this problem. They have the capability to contain more information in a more compact space. IUIDs do this by making use of the 2 dimensional space on the x and y axis which greatly expands the data capabilities and over comes the linear problem inherent with standard bar codes. In military applications, IUIDs contain a Commercial and Government Entity (CAGE) Code, a manufacturer part number, a serial number and often times a national stock number. The



information if written alpha numerically could look as follows "05BU0 175633 5TU98301T6T779J 4210-01-128-9465". All of this information would make the barcode impractically long, and not possible to print or stamp on small items. The IUID however makes it much easier to contain the same amount of information in a small package.

Where an entire production run or class of items would be designated with the same bar code, the IUID is unique to one item and one serial number, making IUIDs advantageous. This not only allows more information to be stored but the entire history of the item can be tracked. With any type of bar code, there is a computer database that is connected to it. When the code is scanned, the scanner references the attached database to view information of the item. This is what makes it possible for

different retail stores to have the same product at different prices. When they store the product's bar code in their data base they attach the sale price to that record. There are not necessarily restrictions to the amount of information that can be stored in the external data record. This data is however limited due to the number of products it represents. It does not make sense to store the manufacturing run time or personnel responsible for an item that has a standard bar code because potentially millions of other identical products have the same code.

With IUIDs this type of data becomes pertinent and relevant. Since each code is unique to one item, everything that has ever happened to the item can be tracked and stored in the data record. It provides increased visibility, as well as specialized tracking and handling. Let's take a military HMMWV as an example. Scanning the IUID on the HMMWV will be able to tell the soldier the original date of manufacturer each time the vehicle has been serviced, what time of service was completed, and who completed the service. IUIDs become especially useful for the military when conducting battle damage assessments and determining when it is necessary to demilitarize the vehicle.

The army is implementing a variety of technology when it comes to item identification. IUID and other projects have been rolled under the office of PM J-AIT, or the project manager for joint-automatic identification technology. In addition to IUID and bar coding, the office employs Radio Frequency Data Collection or RFDC, which includes active and passive radio frequency interface devices (RFID), contact memory buttons or CMBs, satellite tracking systems or STS, and an integrated approach using RFID jointly with STS. There are different programs that manage the use of these technologies but together it is known as radio frequency in-transit visibility or RF-ITV.

RFDC is a growing practice that allows capturing data from items and inventory without the need for a person to directly scan or interface with the item. These systems communicate wirelessly in real time throughout the environment they are employed. The systems require two pieces of hardware, a tag which contains a computer chip and an antenna, and a interrogator which communicates with the tag. Tags can be classified as either active, semi-active, or passive. Active tags have an internal battery and transmit repeatedly at fixed intervals. They allow increased communication distance. They are considered long range and can transmit more than 100 feet. They have added features and can utilize sensors that monitor sensitive aspects of a shipment like temperature, date and time a container has been opened. In military uses active tags are used on high value assets pallets, and containers. Active tags are the most expensive of the three types. Semi-active tags contain an internal battery but only transmit when interrogated. They offer some of the same functionality as active tags but have limited programmability. Passive tags have no internal battery and simply reflect radio frequency signals. They are a data reference point much like bar codes and IUIDs. The passive tags use a small micro chip that contains an Electronic Product Code, which is not human readable and references the interrogator to information in a database. Passive tags are used for item level tracking, are low cost, and disposable.

Contact memory buttons are similar to RFID tags but with one distinct advantage, they are designed to operate in harsh environments. With RFID there are certain conditions that will cause a tag to become "dead" or fail. They are often killed using magnetic energy when they are no longer needed.

Unfortunately the same feature that allows tags to be disabled also subjects them to failure if encountering an electro-magnetic pulse or EMP. They also become less reliable when subjected to extreme temperatures and barometric pressures. The CMB overcomes these issues. They are designed to military specification to withstand various electronic interference, temperature, shock, etc. Another advantage with CMBs is their data storage capacity. Unlike RFID tags, CMBs contain all the data on an internal memory chip. They are available up to 1 gigabyte, offering wide latitude in storage capabilities. CMBs are read using a probe, which upon contact reads the information contained on the button.

One of the best benefits to the Department of Defense using IUID, RFID, CMB, and other inventory technology is the increased visibility and accountability according to a recent article (Erwin 2007). The military and specifically TACOM is a logistics based entity and orchestrating a war is a huge logistics challenge. The U.S. military moved 280,000 tons of material in the first 5 months of 2007. These technologies make it possible to account for equipment and cut down on losses occurring in transit and waste.

Radio identification technology much like RFID is employed for other uses as well throughout military systems. A program called radio based combat i.d. or RBCI is used in the battle field to help prevent fratricide, more commonly known as friendly fire incidents. The technology is much like RFID but on a much larger scale. It uses a combination of radios and software that recognizes the radios and generates an automated reply. Instead of using interrogators that can communicate throughout a warehouse or stockyard, RBCI communicates across miles to identify allied positions on the battle field. A single channel ground and airborne radio system known as a SINCGARS is used as the interrogator which sends out a signal for weapons systems to report their GPS coordinates. Software on the weapons systems recognizes this call and sends back the coordinates as requested through the systems internal radio.

## ISO 9000 STANDARDS FROM 1994 TO THE PRESENT CHANGE

The international organization for standardizations developed the critical ISO 9000 back in 1987 to give organizations the framework to emphasize their quality management systems. Since its introduction, the standard has grown in many ways. After becoming recognized, it came to be widely accepted and then heavily demanded on different industries.

In the late 1990s the ISO 9000 standard, with its last major revision being made in 1994 was heavily scrutinized for the bureaucratic controls it put on industries. Many companies were forced into compliance and lacked the full understanding and commitment to realize the potential of implementing the standard. While the former still holds true today, the latest revision to the ISO 9000:2000 standard incorporates some key elements that the standard was previously lacking. These elements have helped many organizations realize the potential for the ISO standard to impact their businesses quality, functionality, efficiency, and cost-saving initiatives.

The old ISO 9000 standard never required an organization to explore these principles as part of their certification. It relied more heavily on documentation of a quality system rather than its implementation or the results it produced. Critics say that “registration does nothing to guarantee continuous improvement” as many of the goals the standard aimed to achieve were lost in paperwork (Curkovic). The standard required very basic requirements for management. This was fundamentally flawed because it did not require a top-down approach in which management involvement would create the necessary organizational culture to realize the true benefits and results. ISO 9000 merely required that management “establish a quality policy which was to be communicated to the rest of the organization” (Curkovic). The idea was that when management communicated its policy, quality was then expected of the rest of the organization and required little further top involvement. The new standard has done a lot to correct this misassumption. It emphasizes that in order for quality to be a strategic objective, its most vital role is in top management.

I had the chance to interview a colleague, Mr. Don Tice, who has worked on various ISO 9000 projects including Army implementation the production facility at Rock Island Arsenal. Mr. Tice helped further my understanding with the flaws in the 1994 standard. Many organizations were forced into compliance and did not fully understand what it meant. In order to achieve registration many businesses would force mass documentation. The result was an enormous document that was difficult to understand and reference. The process generally added no value to the organization and did little to improve processes.

This exercise in documentation created many problems when the organization would schedule their certification review. Beyond the cost of documentation, the costs of review and certification quickly surmounted. Auditors must be certified by the International Organization for Standardization in, and their compensation is paid by the company who is seeking certification. When companies created such large documents, the auditors would be required to review the entire document which was a lengthy process. It would often take multiple auditors several all expenses paid trips to the company to complete the review process.

The high cost of certification often led companies to develop weak standards. Mr. Tice referenced one specific instance with a local company. According to him this company tried for years to achieve certification and continually failed. The senior executives fired many competent managers as a result of the failed projects. They ended up hiring a manager who guaranteed to get the company certified within 6 weeks of his date of hire. The way he did this was by keeping standard books tucked away in a desk on documenting processes. The ISO 9000:1994 standard granted certification simply because there were handbooks and guidelines on documentation of processes and it did not matter whether or not any of this was in place or understood by employees.

The shift to the new ISO 9000:2000 standard was to correct many of these problems inherent in the old standard. Instead of emphasizing documentation, the new standard emphasizes understanding. Organizations are now encouraged to focus on the quality of the documentation rather than the quantity. This relieves a lot of the workload put on the auditors in review. It is now more practical for fewer auditors to complete the process in much less time which greatly reduces the cost, giving businesses more incentive to become ISO 9000:2000 certified. In the review process it is now common practice for auditors to hold employee interviews instead of focusing purely on reviewing the documents. In interviews the auditors will ask employees such as production planners, or inventory specialists for instance, what the processes are for certain situations. The auditors will certify that employees know what to do in certain situations and what is expected of them. They will then check for consistency in the responses in two or more employees within the same functional discipline. If the responses are consistent, it proves to the auditors that a quality management systems is in place.

The largest change to the standard was the incorporation of eight principles that direct organizations to the proper core values and concepts of a quality management system. These principles were put in place to clarify some large criticisms of the old standard as well as direct businesses to use the standard more effectively. The eight principles that will be explained are as follows: customer focus, leadership, involvement of people, process approach, system approach to management, continual improvement, factual approach to management, and mutually beneficial supplier relationships. Many of these principles are interrelated and their addition of these principles was fundamental for many reasons.

A customer approach emphasizes why your organization is in existence. Without the customer you cannot sell your product. As such your customer's needs and expectations (current and future) have to be clear. This clarity will help an organization take a proactive rather than reactive approach to maintaining and securing future business. There must be open channels of communication between the organizations with the ability to pass all relevant customer expectations down to the appropriate levels of management and production.

Leadership (as stated in the previous section) is key to implementing any effective QMS. People in leadership roles must show their commitment to the success of the program and constantly emphasize to their employees how compliance will be mutually beneficial to their careers and the goals of the organization.



Involvement of the people in the organization is only way to achieve success. Not only do employees need the proper training and skill sets to implement the requirements of the ISO standards, they must be aware of the impact they are making and the dedication of management to continuous improvement.

Taking a process approach ensures that all activities can be properly documented and monitored. No matter how small task, management has to establish a standard procedure to be followed. From this (given that the appropriate metrics and measurement systems are in place) it becomes easier to notice variations in the process and attribute those to specific activities. The activities which account for variations from the standards can then be avoided or improved upon. .

A systemic approach to management gives a level of consistency to an organization that is vital the successful involvement of all people in the organization. A system is only as efficient as its weakest part. As such this approach will help to ensure that all functional areas and levels of management are working properly. It allows certain managerial actions to be prescribed and predicted by all parts of the organization. It helps direct employees actions by making them aware the processes and procedures in place to be followed given certain circumstances. Most of all this approach enables a level of fluidity to ensure that important information is not lost among the layers of management.

It would seem to be implied that any successful organization must make factual based decisions to be successful within their industry. More often than not though, organizations do not have the proper metrics and measurement systems in place to correctly analyze their processes and business functions. Previously decision models would use rudimentary rankings such as good, fair, or poor. The ISO 9000:2000 standards emphasize the need to have comprehensive metric and measurement standards that give rankings based on numbers and weighted scales. When top management has solid figures, statistics, and data to go by, it eliminates the possibility of making decisions based on assumptions or old and skewed data. Management can hone in on the real problems their organizations are experiencing and take the proper corrective action.

Finally mutually beneficial supplier relationships bring these eight principles back full circle. Just as it is prescribed above to have a customer driven approach, an organization must realize the needs and expectations of their suppliers as their customers. This principle emphasizes the ISO 9000:2000s' focus on the entire supply chain. An effective supplier partnership program will help guarantee that an organization is receiving the quality inputs it needs to meet their customers' expectations their output. It helps an organization develop the cradle-to-grave life cycle management approach that ensures suppliers, manufacturers, customer, and entire industries maintain the level of vitality needed to secure a place in the future market.

There is a lot of overlapping area between the old and the new standard. As such if an organization already has the old standard in place, becoming certified to the new standard may not be that difficult. Beyond the eight principles of the new ISO 9000:2000 standard several key processes have been added to the procedure list. The *balanced score card* was added to help management develop the proper metrics and measurement standards. *Communication processes* need to be drawn out and

defined to ensure the proper external linkage between the organizations, its suppliers and customers; as well as internal communication of throughout the organization itself. *Infrastructure Proceses* are to be put in place so that the proper equipment and facilities are in place to meet the demands of the organization and to develop the proper maintenance, repair, and calibration procedures. *Post-market Surveillance Processes* help in analyzing the feedback of the customer so that an organization can take on an anticipatory role when determining future changes and demands. *Resource Management Processes* were added to enable a greater understanding of allocation of key resources and reduce what is being lost to scrape and waste. Finally *Validation Processes* were added to analyze questions like; do the processes make sense to the actual user? Are they value adding? Are the processed resulting in the desired outcome? Etc.

The new ISO 9000:2000 standard is a very effective tool for any organization if it is used properly and for the right reasons. Many of the original criticisms do still exist. However, there are noticeable connections between organizations reasons for implementing the standards and the results they experience from them. If top management can see the implementation as being beneficial for the whole organization in the long run, realize that the documentation process will uncover some of the most fundamental problems in their business, and focus more on the long term cost savings rather than the initial expense, then that organization will most likely foster efficient growth and a long term competitive advantage.

## ISO 9000 AND ISO 14001 THE DIFFERENCES AND SIMILARITIES

The International Organization for Standardization is a body that explores and develops different standards to help direct businesses to achieve common goals. Two standards in particular, ISO 9000 for Quality Management Systems (QMS) and ISO 14000 for Environmental Management Systems (EMS) have recently and quickly begun to impact industry wide supply chains. These two standards, while aimed at different end results, possess many similar characteristics in their underlying structure, process applications, and implementation strategies. They both receive similar accolades and criticisms.

The ISO 14001 standard is different from the 9000 standard in that its goal is to help an organization assess their processes and practices with an environmental conscious rather than quality. The five requirements of ISO 14001 registration include formation of a corporate environmental policy and commitment to an EMS, development of a plan for implementation, implementation and operation of the EMS, monitoring and possible corrective action, and top management review and continuous improvement. Similarities can be seen with the 9000 standard in that continuous improvement and top management involvement are key. But unlike ISO 9000, 14001 does not require a firm to be registered. 14001 can be self declared and go unmonitored. It is unlikely however that when 14001 is required by an organizations customers that self declaration will be adequate to meet the customers demand. As OEM's of various industries are beginning to require 14001 compliance from their tier 1 suppliers the burden is then being placed on tier 2 suppliers and down to the smallest organizations in the chain. 14001 require a larger capital commitment than its 9000 counterpart and carries with it a heavier cost. Small organizations often beg for self-declaration to avoid the surmounting costs that come with registration of the ISO 14001 standard.

As with ISO 9000, the 14001 standard contains certain ambiguity that is designed to make it applicable to many organizations of various sizes. This ambiguity allows an organization to design a set of policies and procedures that will be complementary to their market segment and foster the appropriate growth and results for their business goals. While this type of design possesses great functionality, it is scrutinized for its vagueness and lack of positive end results. We see many of the critics of the 14001 standard take aim at it with the same arguments as that of the 9000 standard.

One of the most common arguments against both standards is that they fail to produce the appropriate results. ISO 9000 is said to develop large amounts of policies and procedures for implementing a quality system, but does nothing to see that the goals and benchmarks are even met. The standard is seen as being procedure based, not performance based. The same criticism is seen with the 14001 standard. When obtaining registration for this standard, a organization must go through a rigorous process to address its environmental impact. But the standard is not directly connected performance and does not tell a company how to improve efficiency or pollute less. The standard excludes any specific performance criteria. Other similar criticisms include risks of "financial, exposure, change management and lagging the competition" (Curkovic).

When addressing this concern, looking at the design of the standard is vital. It is true that the standard itself is not guaranteed to foster growth and success. Growth and success come from how

serious and disciplined an organization is about adhering to the procedures it puts in place. Different levels of success are seen in the type of approach an organization takes when implementing this or any type of non-regulatory standard. The proactive organization will see an EMS having the potential to reduce costs and improve efficiency in the long run. The reactive organization who implements this type of standard due to customer requirements is likely to not use it appropriately and realize the long term benefits.

When preparing for registration an organization is forced to look in depth at their practices and evaluate areas for improvement and concern. Without this type of analysis it is impossible for an organization to truly grasp their environmental impact. The 14001 standard will help an organization “develop appropriate metrics and set targets for reduction such as energy consumption, recyclability content, material waste, material toxicity, and emissions” (Curkovic).

Benefits of implementing the ISO 14001 standard have been widely seen by the proactive organization. An effectively implemented strategy will set targets to reduce raw material waste, disposal costs, and natural resource consumption. It will allow management to keep records of disposal of waste and track which activities cause excess consumption.

The standard encourages an organization to reduce or eliminate and activities that are highly detrimental to the environment, but this causes one major flaw in the idea of EMS. To reduce their emission levels, an organization may choose to cease all activities that release high levels of pollutants. This is not to say that the activities do not need to be done as many of them are fundamental to the overall manufacturing processes. As such ISO 14001 then encourages organizations to outsource such activities, taking the burden off that company but pushing it further back in the supply chain. The standard then promotes a level of avoidance, rather than action to improve the detrimental activity.

It has been seen that implementing the ISO 14001 can be done more quickly and effectively if an organization already has the ISO 9000 standard in place. Both of the standards require similar documentation and process exploration. As such when the 9000 standard is already used, much of the work for implementing ISO 14001 is already done. The two standards can also be developed simultaneously which reduces the overall cost of implementing both standards and cuts out many redundancies in the systems.

At TACOM LCMC there has been an extensive environmental management policy implemented compliant to the ISO 14000 standard. The top down commitment is ingrained in the program beginning with a work directive from the commanding general, passed down from the secretary of the army and the Joint Chiefs of Staff. All Garrison locations under the Department of the Army are required to have an environmental management system compliant to ISO 14001 in place. The army refers to the (Plan-Do-Check-Act) mentality of that encompasses the EMS. This is the simplistic framework for which all environmental operations and activities are directed under.

The army has choose to focus on what they call significant aspects and impacts. These are defined by the emissions, and outputs that installations require, and how they affect the surrounding land and communities. Specifically they focus on air and water quality, recycling, and energy consumption efforts. The installation here has been retrofitted to eliminate hazardous waste that comes out of smokestacks and the waste water that is returned from our cooling pond. While there is not a strict zero-emissions policy, the directive is to meet current EPA standards and for continuous improvement. The installation has also implemented recycling mandates. All recyclable materials are required to be sorted on site and disposed of properly. All work areas are provided with sufficient recycling receptacles to handle their paper waste. These work areas are required to empty their paper recycling into the large receptacle located in the main hallway of each floor. Each floor or significant location is also provided with receptacles to receive cardboard, plastic, metal, and other "co-mingled" waste. There are other receptacles located conveniently throughout the location that handle batteries, printer cartridges, and light bulbs. Any florescent tube lighting to be replaced has to be returned to the warehouse on site that for collection and proper disposal due to mercury contents.

The Tank Automotive Research Development Engineering Command which is collocated on the installation has more stringent requirements for their waste. They produce hazardous waste and use harsh chemical paints and coatings in processes. They also subject equipment to battery of hazardous testing including chemical and biological agent testing. Our EMS covers with precision details how to handle all of these situations as well to ensure a safe working environment and healthy surrounding community.

TACOM is ISO 9000 certified and compliant as well. Additionally it is a strict requirement that suppliers we deal with be ISO 9000 certified.

## Electronic Reverse Auctioning.

Electronic reverse auctioning, also known as e-RA or online negotiation, was created in the mid 1990s. It is an online, real time auction between pre-qualified suppliers who compete against each other based on price. Electronic reverse auctioning is a method of solicitation in which a company looking to make a purchase releases its specifications or design requirements into the market and allows potential suppliers to bid on the contract or sale. It can be very effective in narrowing down the pool of potential suppliers to only those who have the capabilities, capacity, and competitive price. Electronic reverse auctioning has various constraints but has become a very powerful tool when coupled with web based technology.

The growth of the technology came with the development of the internet and real time capabilities. It has the advantages of opening up the pool of potential suppliers globally because firms from around the world can all access the solicitation and bid simultaneously. The technology reduces the constraints and bounds of distance and helps to flatten the world as author Thomas Friedman would say. The technology became popular with the development of user friendly third party hosted software and negotiation sites that can be controlled by the soliciting firm with little outside assistance. As industry changes like ISO 9000 and standards of quality became widely accepted as common practice, lowest price started to be the main focus of many firms. These firms deem quality and capability as givens throughout the industry.

The process of E-reverse auction comes with heavy criticism from certain industries. It has been referred to as “buying with your head in the sand” in the case where the buyer makes an agreement with the supplier without ever knowing anything about them, their facilities, their true capabilities, etc. (Casals 2004). While this can be correct it truly depends on how you use the tool. There is a main difference to note between using the electronic reverse auction to make a purchase and using it as a tool in source selection. In the latter the soliciting firm or agency never makes formal agreement or contract to purchase but rather weeds out the potential suppliers to a much narrower window.

Another criticism is that e-RA leads to an environment that is dominated by aggressive price competition. In this environment there is little emphasis placed on strategic supplier development, mutually beneficial relationships, or total cost of ownership considerations. When the sourcing firm announces that it will begin making purchases with e-RAs many suppliers (including those who previously had long term relationships) are forced into compliance for fear of losing business. In this manner the process can lead to enormous cost cutting and reductions in quality as smaller suppliers try to compete with multinational or foreign firms that have significantly lower direct manufacturing costs. So while the process may reduce total purchase cost, it can significantly increase total landed cost and total cost of ownership when future factors of quality, service, technical abilities, and long-term commitments of the supplier are factored into the equation.

Electronic reverse auctioning also has many benefits as noted by its growing popularity and use. There are obvious direct cost reductions. It forces suppliers to look at the cost of their inputs and make reductions where possible. The process also increases visibility among competitors. So when suppliers

are able to see what the prices their competitors are bidding it makes them look at their inputs and variables in production for ways to reduce and become more competitive. It has been reported that once an industry enters e-RA for a buy, prices for that item are reduced in ranges from 10-20 percent. If the process is used strategically the cost savings can benefit both parties involved. While the solicitor benefits from the lower price, the supplier benefits from finding methods of cost reduction. Another beneficial aspect of the process is that it opens up the opportunities for suppliers to gain new business that they may once not of had access to. For suppliers it also lowers marketing costs, award and cycle times, and increases constructive feedback from customers as to why or why they did not win the bid.

The federal government is an enormous user of the electronic reverse auction. Nearly all purchases by TACOM are forced to go through the process. It is not used or delivered as a contract, but rather a tool in the contracting process. The government uses it as an invitation to bid on a solicitation but it is never an agreement that a supplier can reasonably act on without further guidance or permission by the government. After the e-RA process is done, contracting and further negotiating begins.

One example of an e-RA application is the Defense Logistics Agency (DLA) Internet Bid Board System (DIBBS). "DIBBS is a web based application that provides the capability to search for, view, and submit secure requests for quotations for the DLA items of supply. SIBBS also allows users to search and view request for proposals, invitations for bid, awards, and other procurement information related to DLA. "It is beneficial to many as it is an open application that is easy to gain access to. Potential suppliers can go into the system and search award history for potential contracts that they know they can compete on. In this way they can narrow them down based on their capabilities.

TACOM specifically uses a website called the Army Single Face to Industry or ASFI to solicit its contracts. I spoke with Tanya Karasavvas who is a contract specialist for TACOM and she provided me with the following information. All purchases must go through the ASFI unless they are for sensitive or classified materials. In that case the Army will use a sole-sourced procurement with a trusted supplier whose capabilities are known. When a purchase is less \$100,000, the contract is posted as a request for quote and typically the lowest bidder will be awarded the contract. The army does not go for the lowest bidder, but rather the lowest technically acceptable price. This term allows the contractor specialists the discretion they need to ensure the source that is selected has the capability to meet the requirements of the contract. In a normal bidding situation for instance, if 5 bids will come in on a contract all around \$80,000 within a normal range then in this case the lowest bid will be accepted. But for instance, if one out the five bids is significantly lower, saw \$60,000 then the contract specialist will be allowed to further investigate. In this case they will ensure that the contractor fully understands the requirements of the contract and has the capabilities to meet them. When a purchase is over \$100,000 then the solicitation is considered to be a request for proposal. The lowest bids will be placed higher on the list of potential sources, and then the capabilities, relationships, and other considerations will be made in awarding the contract.

There is a required period that the solicitations must be posted for to ensure that potential sources of supply have the opportunity to view and assemble a proposal. The time is generally 45 days which includes an initial 15 day announcement that the solicitation will be opened, and then a 30 day bidding period. In certain situations solicitations will not be open to the general public but rather a pre-determined list of suppliers. This situation can arise if for instance the contracting specialist has determined that two or more small businesses may be eligible for the contract. In this situation the solicitation will only be open to users registered as a small business defined by the Federal Acquisition Regulation guidelines. When a solicitation is over the amount of \$550,000 there are other considerations that come into play regarding small businesses. After the solicitation period when the contracting specialist is negotiating lowest bidders on the RFP, the contractors will be required to submit a sub-contracting plan that includes the use of small and disadvantaged business entities. If the contractor who is best suited as the source of supply has a plan that contains less than 5% of its requirements coming from small businesses, then the plan must include a method and timeline of increasing its sourcing requirements from these types of entities.



## MALCOLM BALDRIDGE NATIONAL QUALITY AWARD

The Malcolm Baldrige National Quality Award is an amendment to the Stevenson-Wydler Technology Innovation Act of 1980 that establishes a National Quality Award to encourage American business and other organizations to practice effective quality control in the provision of their goods and services.

The award was created in response to the lagging quality standards of American industries compared to their foreign counterparts to help stimulate American companies to improve quality. The idea is to strive for recognition and pride and as such gain a competitive advantage through increased profits.

It was created in 1987 by the United States Federal government when congress passed Public Law 100-107 which states that the leadership of the United States process quality is being challenged by foreign competition. American businesses are beginning to recognize the cost of poor quality which can account for up to 20% of sales revenues. Our productivity growth has increased less than foreign competitors. A commitment to excellence in manufacturing and service is essential to our nation's economy. Improved management and a focus of statistical process control have led to dramatic improvements in cost and quality of manufactured products. Quality improvement is relevant to small and large industries alike. These improvement programs must be management led and customer focused. Other countries have already coupled national awards with private sector quality audits to identify the industries best. Finally a national quality award would improve quality and productivity in the United States.

Several awards are given each year in different categories. They are given in manufacturing, health care, small business, non-profit, education, service. These organizations are all judged based on the same seven areas; leadership, strategic planning, customer and market focus, measurement analysis and knowledge management, workforce focus, process management, and results.

Companies use the award to strive to be the best quality advocates. They take pride in winning the award and it is a symbol for industry excellence. Once a company wins the award, their work doesn't stop there. Recipients of the award have been known to dedicate large resources to the training and education of others in their industries. The impact has been huge with a trickle-down effect from the best players to the biggest laggards in the industries.

To date 81 companies have received the award. There is no set number of awards given out each year, and it has varied year to year from only 2 awards going out up to 6.

It has been found that the award has been directly responsible for improvement in using the best most rigorous quality practices and raising awareness on the importance of the topic nationwide. It is considered internationally as a standard for performance excellence.

The Malcolm Baldrige award is very similar to the Deming Award in Japan. Both promote the recognition of quality achievements, but the Baldrige award focuses specifically on several things: results and service, involvement of many different professional and trade groups, provides credits for innovative approaches, strong customer and human resource focus, and stresses the importance of sharing information with competitors across industry. The Deming award focuses more specifically on quality in manufacturing. The award was created with to raise the quality of all American industry rather than provide merit and a competitive advantage to one company over another.

The award does not compare to the ISO standards. The standards are set in place to help companies determine what is needed to assess, improve, and maintain quality. The Malcolm Baldrige award recognizes industry excellence that is already apparent regardless of having a QMS in place. ISO registration covers less than 10% of the Baldrige award criteria. The main focus of the award program is to promote a larger sense of quality awareness an sharing of successful strategies. Recipients of the award are encouraged to share the practices that have led to their success.

## Professional Certifications

Post graduate professional certifications have become an essential part of a developing career. It helps to show a person's dedication and determination in their career field. It advances their opportunities as a subject matter expert. It shows employers that their employee or candidate is a committed life learner, and more. Many professional certifications exist in a wide variety of fields. Often times they are offered by professional organizations in a niche field such as supply chain management, purchasing, project management, human resources, etc. Other certifications can be in software programs and suites offered by the developers or professionals licensed by the software developers. Certifications can also be offered by higher learning institutions in things like network administration, leadership, etc.

Career specific certifications can give a young professional a real edge in their employment opportunities. For the supply chain manager, several institutions exist that offer these types of certifications. The Association of Operations Management or APICS offers certifications including Production and Inventory Management and Supply Chain Professional.

The first of the APICS certifications, production and inventory management or CPIM is tailored to meet the needs of the developing purchasing professional. It teaches advanced concepts in supply chain management, resource planning, scheduling, and operation execution and control. The certification is completed after studying five modules and passing an exam at the end of each. Then a comprehensive exam is necessary to earn the CPIM designation.

After earning the CPIM designation, a person may want to further pursue this certification with the CFPIM or certified fellow in production and inventory management which is also offered by APICS. This is earned not my modules of study, but rather by actively participating in the supply chain field. It awards individuals who take the concept of continuous learning and knowledge sharing seriously by publishing articles, delivering presentations, and instructing APICS classes.

The next certification offered by APICS is the supply chain professional or CSCP designation. Unlike CPIM, CSCP gives a broader perspective of the entire supply chain. It focuses on the entire value chain from end to end. It gives the student the wide perspective of how their activities are interrelated into other organizations and allowing them to incorporate this into their strategic plans. This certification is not taught like the CPIM. Most of the material can be handled in a directed self study. The only requirement for the certification is passing the exam. Preparation is left to the individual student and APICS offers a variety of options to best fit their needs.

The Institute for Supply Management is another organization that offers several certifications in the supply chain field. The first and seemingly most popular is the Certified Professional in Supply Management or CPSM. To me this seems similar to the CSCP offered by APICS. It is a cross functional certification that delves into the width of the supply chain field. Areas of study include finance, supplier relationship management, organizational global strategy and risk compliance. To be eligible for the degree a person must have a bachelors degree and three years of full time professional supply

management experience. The study materials which can be purchased from ISM include foundations, effective management performance, and topics in leadership. After preparing for the exam the individual must register for and take the test.

Both the Institute for Supply Management ISM, and the Association for Operations Management APICS, have recently begun to phase out some certifications and move towards more comprehensive ones. ISM used to offer both the Certified Purchasing Manager CPM and Accredited Purchasing Manager APM. APICS used to offer Certification in Inventory Resource Management CIRM. These two organizations are now marketing the more comprehensive options as the best fit for growing individuals in the industry.

Yet another organization that offers certification is the American Society for Quality. They offer many different certifications in many different functional areas. The most relevant is the Manager of Quality/Organizational Excellence and the Six Sigma Green and Black Belts. The CMQ is a certification that teaches process improvement initiatives. It teaches things like managing human capital, and projects, financial analysis, risk evaluation and control, among others. The Six Sigma certifications teach value stream mapping techniques and process improvement.

In my work at TACOM I have sat in on a Six Sigma Green Belt project and it is something that is offered widely at my work. We have an office that handles all lean six sigma projects that is headed by the director for continuous improvement. This office will teach and certify employees in the workplace. The incentive to do this is that they will direct employees through the process and as they learn they simultaneously complete a LSS project at TACOM. Green Belts are used as the back bone for Black Belt projects. The green belt projects force the organization to look at and map out business processes. Then the goal is to identify inefficiencies and remove them from the process. The end result is to come out with the leanest efficient process and also have a process map which employees can follow so they ensure they are on track in the process and following the correct procedures. The programs also support the ISO 9000 goals of developing methods for business processes and a system of documentation.

The most valued certification at TACOM seems to be the Certification in Associate in Program Management or CAPM. The reason this one is valued is because it is the outline of the fundamental organizational structure here. We are set up into of Program Management Office which are matrixed to product support integration directorates. When a new weapon system leaves developmental stages it becomes a program of record and is delegated to a PMO. After initial fielding the program is then transitioned to the PSID. CAPM teaches the methodology in program scheduling and execution. It will teach software that has been developed to manage programs, and techniques to identify the progress that is being made.

I spoke with an associate named Don Tice about these topics. I chose him because I knew that he used to be the APICS president for the western Illinois chapter. His initial response was surprising to me. When asking about the topics he referred to it as the good old boys networks. He first told me that TACOM does not require any of these types of certifications and the chance that pursuing them would help me advance was pretty slim. Don is located in the Quad Cities in Illinois which is also the location of

a huge John Deere facility. He said that in his career he noticed a trend in John Deere as to which of these certifications was highly valued and it corresponded to the person who was in charge at the top. 10-15 years ago the APICS certifications were highly valued and employees were being rewarded for pursuing them. At the same time the Vice President of JD also served on board of directors of the APICS council. The desire to pursue the certification quickly spilled over into the JD suppliers and as Mr. Tice said "John Deere Wanna-be's". As long as this person served as VP this is was the major trend trickling out in the industry. But it then surfaced that the VP and many senior buyers who possessed the certification were accepting kick-backs. John Deere had several of them prosecuted. With their integrity compromised, so was the certification they possessed. The CIRM was then devalued and APICS begun its transition to other certifications. The Vice President who then replaced the former was on the board of directors for NAPM, which is now ISM. The trend quickly changed for employees to pursue the CPM certification and be rewarded for it. The trend then trickled through industry just as before. Mr. Tice said that he sees this happening all the time with professional organizations. It seems that when there is a president or vice president of a large organization that serves on a professional BoD or council, the popularity of certain certifications increase. Mr. Tice seemed to suggest that the people who push these certs at the top of the organizations are often rewarded big by the professional societies for doing so. If you look at the cost an individual will pay for classes, study materials, certification, certification maintenance you can see why.

I am not planning on pursuing any of the above certifications. I believe that my career in the supply chain field will be short lived and it would not be worth my time or money to do so. I do however plan to pursue a professional degree. I have plans to enter law school in fall of 2011. I am currently studying to take the LSAT and preparing myself to be best suited to get into a top law school. This includes volunteering in non-profit organizations and an unpaid internship for the Kalamazoo Circuit Court. My schools of choice tend to require a LSAT score of over 160. With my volunteer work, clerking for a judge, my professional internship experience, high GPA, and academic honors I think I will be well positioned to enter a top ranking law school. I am also considering pursuing a dual degree. Many institutions offer the Juris Doctor along with an MBA, or the J.D. with an LLM. The benefit to doing so is that the programs of study are condensed into four years rather than spending three years on each individually.