CADRE

AIR UNIVERSITY

2010 SECRETARY of DEFense CORPORATE FELLOWS program: OBSERVATIONS ANd reccommendations from apple, CATERPILLAR, and General dynamics

by

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A Research Report Submitted to the Faculty

In Partial Fulfillment of the Graduation Requirements

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June 2010

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Preface

This paper summarizes the findings of the 2009-2010 Air Force Secretary of Defense Corporate Fellows who served at Apple, Inc; Caterpillar, Inc; and General Dynamics. Specifically, our academic-year “work study” at these companies culminates in this document where we provide brief company overviews, describe our duty positions, detail corporate observations, and provide several Air Force and Department of Defense-wide recommendations.

Abstract

Corporate America is an ideal environment for the Department of Defense (DoD) to learn best practices, new ideas, and innovative solutions that support the country’s national security strategy. Thus, this paper summarizes the ideas from three Secretary of Defense Corporate Fellows who spent the past year immersed with industry partners.

The paper begins with an introduction of the Secretary of Defense Corporate Fellows program and identifies the 2009-2010 participating companies. Next, the authors introduce Apple, Caterpillar, and General Dynamics providing an overview of the companies, personal observations, and subsequent recommendations for the DoD. A short conclusion synthesizes the authors’ thoughts and reaffirms the benefits of the Secretary of Defense Corporate Fellows Program (SDCFP).

Chapter 1

Fellowship Background

As our Air Force is in transition, we must be bold and embrace change. It is one of our great strengths. Our Air Force is born of innovation, our Airmen are innately adaptable. We have been challenged many times in our history; this is yet another opportunity that we will take on together.

—Michael Donley, U.S. Secretary of the Air Force

September 14, 2009

Former Secretary of Defense William Perry established the Secretary of Defense Fellows Program in 1994 to build a cadre of officers that understand both the profession of arms and the organizational and operational opportunities made possible by the revolutionary changes in informational and related technologies. Additionally, he thought the military needed an appreciation of how this revolution was influencing American society and business in ways that would impact Department culture. Secretary of Defense Donald Rumsfeld changed the name of the program to the Secretary of Defense Corporate Fellows Program (SDCFP) in 2005. He also expanded the program to include both technology companies and those that had successfully reshaped their organizational structures and methods of operation to remain competitive in a dramatically changed global business environment.

Each year, two or more officers from each military service are selected to receive their military senior service college credit by training with sponsoring institutions (corporations, companies, commercial enterprises, etc.) who have earned a reputation for insightful long-range planning, organizational and management innovation, and implementation of new information and other technologies. The program’s main objective is to provide the participating officers with personal experience on the issues facing today’s corporations such as financial crisis, change and knowledge management, virtual workplaces and collaboration, social networking, talent management, and leveraging technology. Ideally, their experiences with industry’s leading edge business practices could translate into the DoD’s best practices. However, this exchange is not one-sided. The selected officers have routinely been able to exchange DoD ideas, programs, and especially leadership training and initiatives. Since the programs initial inception in 1995, over a hundred officers have been placed at 45 different sponsor companies worldwide.

Prior to each Fellow’s immersion with industry, they receive six weeks of academic preparation to become reacquainted with current DoD issues in addition to material aimed at smoothing their transition into corporate America. The Fellows initial orientation begins with a brief education on the current political, economic, social, and business issues facing corporate America. Additionally, Fellows attend a one-week executive education program at the University of Virginia’s Darden Graduate School of Business. Immediately after orientation, Fellows report directly to their sponsor companies, and more specifically their corporate mentors, to begin their fellowship.

A major highlight of the SDCFP is the ability to learn from all the participating sponsor companies through “Company Day” visits. Each sponsor company hosts all SDCFP Fellows for a 1-2 day company overview in which they plan, build, and direct a specific agenda for their respective “company day” with specific emphasis on strategic issues. For example, Fellows are typically briefed by the sponsor's senior leadership which often includes the Chief Executive Officer, Chief Financial Officer, Chief Technology Officer, and Senior Vice Presidents and company Partners. This insightful exchange provides the Fellows with the opportunity to discuss strategy, leadership, management, challenges, and best practices with the industry’s best qualified leaders. The SDCFP culminates in Washington, D.C. where the fellows brief senior DoD officials and Congressional representatives on their observations and provide recommendations they believe would help in transform the DoD. For more specific information about the SDCFP, to include contact information and participating Fellows, please visit the SDCFP's public website: [http://www.ndu.edu/sdcfp/index.htm.](http://www.ndu.edu/sdcfp/index.htm)

The SDCFP director, Mr. Eric Briggs, personally oversees the program and selects the participating companies for each year's program. Only companies with a track record of strong strategic planning as well as constant innovation are selected to participate in the program. The list of companies associated with the SDCFP since its inception is impressive to say the least. The 2009-2010 sponsor companies are as follows: Accenture in Reston, VA; Apple, Inc in Cupertino, CA; Caterpillar, Inc in Peoria, IL; Deutsche Bank in London, UK; DuPont in Wilmington, DE; EADS in Arlington, VA; General Dynamics in Scottsdale, AZ; iRobot in Bedford, MA; and NCR in New York, NY.

Chapter 2

Apple, Inc.

*Here’s to the crazy ones. The misfits. The rebels. The troublemakers. The round pegs in the square holes. The ones who see things differently. They’re not fond of rules. And they have no respect for the status quo. You can quote them, disagree with them, glorify or vilify them. About the only thing you can’t do is ignore them. Because they change things. They push the human race forward. And while some may see them as the crazy ones, we see genius. Because the people who are crazy enough to think they can change the world, are the ones who do.*

—Think Differently Campaign, Apple, Inc.

1997

 Steve Jobs and Steven Wozniak founded Apple Computer, Inc., in 1976. 31 years later Apple Computer was renamed Apple, Inc. to better describe their broader range of consumer electronic offerings. Today, Apple Inc., together with their subsidiaries, designs, manufactures, and markets personal computers, mobile communication devices, and portable digital music and video players, as well as sells various related software, services, peripherals, and networking solutions. The company sells its products worldwide through its online stores, retail stores, direct sales force, third-party wholesalers, resellers, and value-added resellers. In addition, it sells various third-party Macintosh, iPhone, iPod, and iPad compatible products, including application software, printers, storage devices, speakers, headphones, and various other accessories and peripherals through its online and retail stores, and digital content and applications through the iTunes Store. The company sells its products to consumer, small and mid-sized business, education, enterprise, government, and creative customers.[[1]](#endnote-1)

Company History

Not surprisingly, Apple provides limited public documentation concerning its history. Their policy is to look forward, not backwards, which is their model for continued success. In contrast, many outsiders have found enjoyment in writing and producing websites, books, and movies concerning Apple’s past, present, and future. The following paragraphs draw primarily from several of these resources.

Apple was founded in 1976. Steve & Steve began creating and marketing a personal computer named Apple I with their first public display at the Homebrew Computer Club.[[2]](#endnote-2) Soon the company was producing a more sophisticated Apple II home computer and went public in 1980 with incredible success. En route to their initial public offering, multiple employees visited the Palo Alto Research Center and saw the vision for Apple’s future via Xerox Alto’s graphical user interface (gui). In 1984, Apple launched the Macintosh to much fanfare with their famous “1984” stylized commercial during that year’s Superbowl (<http://www.youtube.com/watch?v=HhsWzJo2sN4>). Apple continued to grow, especially in the education sector, but in 1985 Steve Jobs departed the company. Apple continued their growth with such products as the Powerbook laptop, but ultimately suffered tremendous financial losses well into the mid-1990s.

Steve Jobs returned to Apple in 1997 and the next year Apple released the iMac computer and various software offerings with tremendous success. In 2001 the iPod portable music device was introduced and quickly dominated the market. Apple soon provided the iPod with an “eco-system;” the iTunes store which provides music and video for purchase and transfer. In 2007 Apple released the iPhone & later the iPod Touch based on a similar platform. Soon their Application (App) store would provide an eco-system for these two devices through a wide offering of programs and games. The iPad is Apple’s latest product release that has been described as direct competition to both e-readers and netbooks.

 Company Today

Apple broke into the Fortune 100 in 2009 and looks to be accelerating up that list. They have recently become a $50 Billion a year company with profits of $15.6 Billion in the first quarter of 2010.[[3]](#endnote-3) In fact, it would not be surprising for Apple to be in the Fortune 50 by years end. Furthermore, Apple ($244B) is now the third largest domestic company in terms of market capitalization behind only Exxon Mobil ($324B) and Microsoft ($272B).[[4]](#endnote-4) Interestingly, the number of Apple employees is 50% fewer than either of these companies. This subtle fact speaks volumes concerning the way Apple is organized and operates. The company is hyper-lean in regards to personnel. In short, every employee is expected to act as an “action officer” with the functional expertise to create or assist in the creation of a specific product. Furthermore, analyzing the senior executive’s duty titles reveals the company is organized around their product offerings.

This organizational structure should come as no surprise as Apple acknowledges a product-oriented culture. Their passion is to create innovative products designed to enhance digital lifestyles and individual work environments.[[5]](#endnote-5) This is accomplished through a unique business advantage. Apple owns, controls, operates, and integrates nearly all aspects of its products from hardware and software to retail and services. Indeed, “The Company’s overall business strategy is to control the design and development of the hardware and software for all of its products, including the personal computer, mobile communications and consumer electronics devices…to provide its customers new products and solutions with superior ease-of-use, seamless integration, and innovative industrial design.”[[6]](#endnote-6) No other technology company the same ability to control its end-to-end business chain as Apple, and the result speaks for itself.

 Fellow’s Assignment

Lt Col Bill Spangenthal was assigned to John Theriault, the Vice President for Global Security, where he served as a manager in numerous physical security and organizational development projects. His initial task was to assess the operational readiness of the physical security force and security operations center throughout Apple’s Cupertino campus. Following several weeks of analysis, Lt Col Spangenthal led a project to completely review, assess, and update all physical security policies and procedures while recommending additional documentation to further advance campus security. In conjunction with this project, he also began organizing policies and procedures for Apple’s Global Security Operations Center (GSOC) until transitioning this project to the new GSOC manager.

Following these projects, Lt Col Spangenthal assisted John Theriault with re-organizing the Global Security team and developing their 2010 Strategic Plan. In conjunction with this project, he facilitated a weeklong Directors conference that culminated with a Global Security quarterly briefing to key Executive Vice Presidents. In addition to these projects, he organized and executed a comprehensive corporate strategic review for his Secretary of Defense Corporate Fellows Program colleagues.

 Observations

Although, Lt Col Spangenthal’s entire fellowship was spent within Global Security, he was able to interview and interact with many employees throughout the organization at various levels of influence. His primary focus was to discover the “secret sauce” for Apple’s innovation recipe. This journey proved difficult leading to the realization that no innovation panacea exists. Additionally, he discovered the following: 1) It would be extremely difficult to duplicate Apple’s innovative process; 2) Apple’s fanatical focus on products and customers is critical to their innovation; 3) Apple understands and demands centralized control coupled with geographic execution. The following paragraphs elaborate on these insights.

How is it that Apple continues to produce innovative products and what is their recipe? This is a complicated question because Apple is reluctant to provide specifics concerning its operations. However, Lt Col Spangenthal had the opportunity to interview, argue, and discuss this question with numerous leaders within Apple. What he discovered is that innovation is Apple’s cultural keystone that is supported by a rigorous procedural framework. More specifically, Apple innovates by hiring the industry’s best individuals laterally into the company and by utilizing a structured process steeped in technology and artistic integration that leverages Apple’s complete control over its end-to-end business chain.

 Apple’s culture of innovation embraces Jim Collins highly quoted statement, “Good is the enemy of Great.”[[7]](#endnote-7) In short, no product is ever good enough. In fact, the day a new product is released, the expectation is that employees are already behind on that same products spiral development and/or its replacement. Additionally, every product must solve a specific problem. This partially explains Apple’s limited product offering. Apple prefers to be deep rather than broad fearing their product lines will balloon and become diluted if they attempt to “solve every problem.” Furthermore, every product they create must be the industry’s best. Accomplishing such an endeavor demands limited offerings. Thus, saying “No” to most product ideas is far more important than saying “Yes.” This also allows senior executives to stay engaged at the tactical level, ensures product team focus, and allows the company to assign major resources towards solving it’s most difficult problems… thus enabling innovation and setting the industry standard for their products.

Alain Breillatt describes portions of this process in his article, “You Can’t Innovate Like Apple.” In his words, Apple creates technologically pixel perfect mockups so that, “everyone knows and can see and critique how the final product looks. It also means you will not encounter interpretative changes by the designer or engineer after the review.”[[8]](#endnote-8) More importantly, he elaborates on the number of different mockups and designs Apple creates for each aspect of a new product. “Using specified criteria, they narrow these 10 ideas down to three options, which the team spends months further developing…until they finally narrow down to the one final concept that truly represents their best work for production.”[[9]](#endnote-9) Basic arithmetic highlights that Apple discards 90% of their product work so they can bring to market their innovative top 10%. Finally, Breillatt goes into great detail concerning the number and types of meetings that support every new product. These “vector checks” are critical to any organization, but the sheer volume and importance Apple supposedly places on these events is impressive.

Equally impressive is the artistic effort put into every product. Although the previous paragraph was intended to showcase the technological sophistication of Apple’s process, at least the same effort is demanded from their artistic designs. They want customers to love the way Apple products feel and look, not unlike a fine piece of jewelry or expensive watch. Each interaction with Apple products are supposed to elicit emotional responses. They want customers to interact with a product for the first time and instantly feel good about both the item and themselves. Apple seriously wants each customer to feel as though their life is somehow better because they are using their products. Achieving this incredibly high artistic standard is practically impossible. Yet, this is the standard Apple insists upon when creating each piece of software, hardware, and service application.

 Clearly Apple has a fanatical focus on both their products and customers. The company’s goal is to provide every customer with the best user experience. Products are designed to deliver everything consumers desire to include numerous features customers didn’t even realize they wanted. How is this possible? Apple mirror-images by using its employees as its test-bed for the customer, but typically one with an engineering degree or background. By doing this, Apple does not react to what the market says it wants, it drives what the market wants by creating products we did not even know we wanted! Thus, Apple knows what the consumer wants and anticipates (sometimes dictates) where a market should go. Additionally, the company is hypersensitive to providing the industry’s best service for every product. In fact, they even have ratings on their Apple Store web site where customer’s can evaluate their products. This is dangerous ground, but the company incorporates this direct feedback towards process and product improvement.

It takes a unique organizational structure to operate in the manner described above. Lt Col Spangenthal’s observation is that Apple is a very flat organization with no readily identifiable staff (in the military sense) personnel. If one looks at the duty titles for the executive vice presidents it appears that the company is organized around products and more specifically, product functions. For example, there are Executive Vice Presidents for: iPhone Software, Industrial Design, Retail, Worldwide Product Marketing, Mac Hardware Engineering, Device Hardware Engineering, and Software Engineering. This functional approach allows the company to centralize control of these operations while geographically executing physical production, packaging and worldwide sales. Although Apple is now considered a $50Billion dollar company, this flat and centrally controlled organization allows their senior leaders to remain extremely engaged with each and every product function. This capability is typically reserved for smaller, so called start-up companies and is an enduring attribute of Apple. Additionally, a functional approach necessitates functional expertise. Employees are expected to execute flawlessly within their domain. They are not expected to laterally develop other functional skills. This concept can be detrimental to leadership growth, but highly successful in mastering individual functions.

So, is it possible to innovate like Apple? Yes, however, it would require overcoming tremendous obstacles to fully mimic their success…maybe. Most companies would require some if not complete re-organization, a dramatic decrease in product offerings, numerous cultural changes, abundant resources, high performing individuals and teams, and leaders with the vision and functional expertise to be the best in their profession. This is their cost of innovation and is why it’s almost impossible to innovate precisely like Apple.

 Recommendations

The Department of Defense (DoD) is obviously a much different organization than Apple. However, the DoD could improve in several areas by leveraging Apple’s best practices in the following areas: 1) flattening the organization, 2) decreasing the number of military hardware and software platforms across the services, 3) engaging in market driven innovation and 4) reducing personnel “generalists” while increasing the number of “specialists”.

A basic tenant of military operations is centralized control and decentralized execution. However, considering the shear magnitude of the DoD, one may question if either is truly possible. Attached is an organizational chart for the DoD from Jan 2008.[[10]](#endnote-10) There is an office of the Secretary of Defense (OSD) with multiple Under Secretaries and Assistants plus 11 Field Activities and 17 Defense Agencies. There are also ten Combatant Commands, the Joint Chiefs of Staff, four Services with numerous Commands and Agencies, and the Inspector General. All these entities have their own staffs. Furthermore, during combat operations, additional staffs are often established. Lastly, numerous staffs exist down the chain of command to the lowest command elements. The magnitude of hierarchy that exists begs the question of what layers could be eliminated in an effort to “flatten” the DoD and reinvigorate innovation through more efficient implementation of centralized command and decentralized execution?

One could argue that today’s technology and the speed of information transmission supports the shrinking & consolidation of traditional staffs. Apple exhibits such a model, as they have no true staffs. In essence, every employee is an action officer. Furthermore, they appear to leverage small teams of their best individuals to solve their most difficult tasks across functional lines. Once complete, these teams are sometimes disbanded and reallocated back to their traditional organization or simply re-allocated to other higher priority tasks. Perhaps a more efficient model across the DoD is to combine and/or eliminate many staffs and simply bring together high performance functional teams around priority situations as necessary. This would allow our most talented individuals to always align against our most pressing concerns. Furthermore, senior leaders would increase their ability to leverage centralized command through fewer organizational layers. Lastly, the DoD’s reduction in staff manpower billets would allow more individuals to re-enter operational fields or engage in other innovative ideas.

In the 90s, Apple learned a difficult lesson in product offerings. A return to basics involved dramatically decreasing their number and types of products sold. The DoD has a similar problem today in terms of the vast number of software and hardware offerings across the department. In some respects, the DoD is attempting to address this issue. One could use the implementation of Microsoft Office or the Defense Travel System as relatively successful templates of standardizing a software system across the department. Today’s F-35 program could be a hardware example. Of course, these programs are just the beginning and the F-35 experiment could eventually become the counterpoint of too much reduction in options. Still, an approach that continues to bring the DoD towards greater interoperability seems best. For instance, each military service has a separate Portal that provides a useful mechanism for indibiduals to quickly access their most important information. Yet, accessing information across the services is limited at best. Thus, a universal e-mail directory might be useful in an era of increased Joint Operations as would unrestricted access to each service’s portal.

Another broad example concerning product offerings is unmanned aerial systems (UASs). According to one source, “In the U.S. alone, over 80 companies, universities, and government organizations are actively developing one or more of some 200 UAV designs.”[[11]](#endnote-11) Thus, with multiple agencies procuring these many UAS variants, it is unlikely that these platforms will cohesively communicate and synchronize with all the other UASs and manned platforms across the air and space domains. Thus, a well-coordinated DoD investment strategy led by a single agency that manages UAS variants, to include onboard hardware and software, would assist with greater interoperability and likely lead to monetary savings resulting from fewer contracts.

Apple’s reduction in product offerings yielded an additional strategic advantage. It also allowed the company to focus its research and development (R&D) on fewer products, which they intended to market. This narrow focus has sometimes been described as “market driven innovation” whereas finite resources are strategically massed against priority projects for a specific market. Additionally, these priority projects are technically feasible, solve a specific problem, and are part of a focused business plan. At one time, our government (especially the DoD) was the catalyst for American innovation and rallied in just such a market driven way in such successes as the Manhattan Project and Apollo programs. For various reasons, the DoD’s leading role in technological innovation has steadily declined while limited funds are spread across numerous R&D projects in numerous R&D facilities. Therefore, a comprehensive and targeted investment strategy coupled with fewer, but more highly resourced, projects might yield more innovative solutions.

A final recommendation is derived from the value Apple places on “functional” versus “general” expertise. One would find it extremely difficult to find a general manager employed at Apple. The company hires functional experts and expects them to primarily, if not exclusively, perform in their area of expertise. Career broadening assignments, for example, were atypical. This lifelong advancement in a single area of expertise absolutely limits a breadth across the company, however, it provides a depth of knowledge critical to solving the most difficult problems. This focus on functional expertise is somewhat parallel to the special capability residing in the Guard and Reserves where individuals may spend their entire careers at a single location performing the same tasks on or with the same platforms.

 It appears this same level of functional expertise is not necessarily found throughout the Active Duty Forces. In fact, the typical officer career path is designed to broaden their skills and often requires a transition

**Chapter 3**

Caterpillar, Inc.

*Our future is built on the work we do today. Losing our focus on technology and innovation is not an option. We can either lead in this area or watch as others pass us by. We choose to lead.*

James Owens – Caterpillar Chairman and CEO

Caterpillar is the world's leading manufacturer of construction and mining equipment, diesel and natural gas engines and industrial gas turbines. For more than 85 years, Caterpillar Inc., also known as "CAT", has been driving positive and sustainable change on every continent. They deliver products, services and technologies in four principal lines of business: Machinery, Engines, Logistics and Financial Products. With more than USD $67 billion in assets, Caterpillar was ranked number one in its industry and number 44 overall in the 2009 Fortune 500.[[12]](#endnote-12) Because of the company’s strength, Caterpillar stock is a component of the Dow Jones Industrial Average.[[13]](#endnote-13) The key to their success is Caterpillar’s worldwide dealer network which spans over 3,500 offices in some 180 countries. Caterpillar machinery is easily recognizable by its trademark yellow paint scheme.

Company History

The origins of Caterpillar date back to **1890 when** two visionaries named Benjamin Holt and Daniel Best began experimenting with various forms of steam tractors for use in farming. Although they worked separately in different companies, both emphasized first-class engineering and manufacturing operations, customer service and a commitment to quality, innovation and customer value. While Holt specialized more in wooden wagon wheels and axles and Daniel Best focused more on farm equipment, they both developed different variations of a combine and a steam traction engine that were being sold worldwide by the early 1900’s. Over the next twenty years, they developed the first track-type tractors powered by steam and gas that were eventually used in World War I. In fact, over 10,000 of their tractors were used to haul artillery and supplies by the allies. Then i**n 1925,** the Holt Manufacturing Company and the C. L. Best Tractor Co. merged to form Caterpillar Tractor Co. The first Diesel Sixty Tractor rolled off the assembly line in East Peoria, Illinois, six years later and the “Caterpillar” legacy began. [[14]](#endnote-14)

Caterpillar dedicated itself to finding a new and efficient source of power for track-type tractors and by 1940 their product line now included motor graders, blade graders, elevating graders, and electrical generating sets. Caterpillar also dedicated significant effort to helping the US effort in World War II as they helped design a special engine for the M4 tank. Their newfound emphasis on engines became extremely profitable for the company. In fact, in 1953 engine sales accounted for approximately one-third of the company's total sales and revenues so they developed a separate sales and marketing division to better serve the needs of a broader range of engine customers.
Then in the mid 1960’s, Caterpillar formed one of the first joint ventures in Japan by acquiring Mitsubishi Heavy Industries Ltd. Caterpillar Mitsubishi Ltd. started production in 1965 and is now the second largest maker of construction and mining equipment in Japan.[[15]](#endnote-15)

**After the worldwide recession in 1981-83, Caterpillar started to offer leasing options and financial services to its customers**. This marked the start of the Caterpillar Financial Services Corporation. At the same time, the company began looking for ways to reduce the impact of the recession. One way they did this was to implement a plant modernization program. They also began to diversify its product line, so in **1986, t**he Caterpillar Tractor Company changed its name to Caterpillar Inc as this was a more accurate reflection of the enterprise's diversity – it now had over 300 products. During this worldwide recession, Caterpillar was forced to draw down the workforce and slow production. Leadership within Caterpillar looked for ways to lessen the impact of future recessions so in 1987, they reorganized their corporate structure. Their newly matrixed organization emphasized decentralization by using business units and service divisions which allowed them to focus more on customer satisfaction and return on assets by product line. This structure formed the backbone of the organizational structure that Caterpillar uses today.[[16]](#endnote-16)

**The turn of the century brought many accolades to ever growing Caterpillar, as in 2001 they became the** first company to globally launch 6 Sigma and deliver first-year benefits in excess of implementation costs. And, in 2003, Caterpillar became the first engine manufacturer to offer clean diesel engines fully compliant and certified by the U.S. Environmental Protection Agency (EPA). This was particularly impressive because Caterpillar's “breakthrough emissions control technology was designed to comply with EPA standards without sacrificing performance, reliability or fuel efficiency.”[[17]](#endnote-17)

**Company Today**

Today, Caterpillar’s global presence, product depth and financial strength enable them to remain extremely competitive in the tough economic marketplace. With 2009 sales and revenues of $32.4 billion, Caterpillar has become the world’s largest manufacturer of construction and mining equipment, diesel and natural gas engines and industrial gas turbines. Their business portfolio also includes Caterpillar Financial Services, Caterpillar Remanufacturing Services, Caterpillar Logistics Services and Progress Rail Services. Caterpillar employs more than 93,000 people around the world and distributes its products through a global network of 178 Cat dealers. Caterpillar products and components are manufactured in 50 U.S. facilities and in over 60 other locations, in 23 countries around the globe. Caterpillar’s global headquarters is located in Peoria, Illinois.[[18]](#endnote-18)

For the last 85 years, the Caterpillar name has been associated with the highest level of quality products and customer service. The Caterpillar brand continues to grow in strength around the world, fueled not only by market success and innovation, but also the Caterpillar Global Dealer Network. This network of independent dealers is Caterpillar’s face to the customer and has long been recognized as the best in the world at distributing parts and equipment. They understand that whether the customer is a major mining operation or an independent contractor, Caterpillar products need to maximize uptime. Therefore, Cat continues to build an extensive network of dealers all around the world. Currently, there are 51 dealers located in the United States and 127 outside the United States which serve 182 countries and operate in 3,518 places of business, including dealer rental outlets. Through these dealerships, Caterpillar has built long-term relationships with customers around the world.[[19]](#endnote-19)

Caterpillar likes to claim that it “powers world progress” because their solutions have built the infrastructure that enables people around the world to enjoy a better quality of life and higher standard of living. Caterpillar is a technology leader in a wide range of industries, including general and heavy construction, mining, forestry, energy and electrical power generation. In more than 180 countries around the world, CAT equipment is at work on highways, rail lines, oceans and rivers, in forests, quarries and oil fields. Today, more than 3 million machines and engines are in active use around the world.[[20]](#endnote-20)

Fellow’s Assignment

Colonel Linda Hurry’s tour with Caterpillar, Inc was divided into two separate assignments. For the first half of the year, she was assigned to the Motor Grader Product Group in Decatur, IL where she facilitated the approval process for the design, production, operations and logistics for the new North American Motor Grader production facility in North Little Rock, AR. In doing so, she helped create and implement a governance structure to streamline decisions between CAT senior leadership, the product group and the leadership team of the new facility. Col Hurry also assisted in motor grader cost reduction efforts by helping reduce the excess inventory of tires and rims by overseeing the Caterpillar/Goodyear tire auction. Similarly, she orchestrated a project to further reduce product cost by designing a new supply chain for the tire and rim process as they prepared to move from Decatur to North Little Rock.

For the second part of her assignment, Colonel Hurry was assigned to the North American and Asia-Pacific Division of Caterpillar Logistics Services, Inc. While there, she helped facilitate logistics partnering opportunities between Caterpillar, Delloitte, and Oniqua to combine the best commercial practices into the most advanced, scalable logistics solution set that could increase efficiency, improve service delivery and lower risk and cost to external clients. Additionally, she helped develop a plan for Caterpillar to provide 3rd party logistics services to major companies in the oil and gas industry and assisted in the development of a 5-hour oil and gas familiarization course.

**Observations**

Like Lt Col Spangenthal at Apple, Col Hurry spent the year trying to determine what the secret to Caterpillar’s success was. Clearly, any organization that could emerge from 2009 with over $32 billion in sales and revenues in spite of the extreme economic challenges was doing something right. While there were many things that stood out as key factors that make Caterpillar an absolutely outstanding company, Col Hurry will highlight some observations in the following areas: 1) the Worldwide Code of Conduct, 2) Enterprise Strategy and Vision 2020, 3) the Trough Plans and Bullwip effect, and 4) the institutionalization of 6 Sigma principles in the New Product Introduction (NPI) process.

**Worldwide Code of Conduct**

One of Caterpillar’s greatest strengths is the diversity of their workforce. Caterpillar’s personnel come from many different locations, backgrounds, experiences, and cultures; therefore, they needed something to bind them together. Caterpillar’s answer was their Worldwide Code of Conduct, which was first published in 1974. Much like the Air Force’s Core Values, Caterpillar’s Code of Conduct (highlighted in Figure 1 below) is a set of values and principles that defines what they stand for and believe in. It documents the uncompromisingly high ethical standards the company has upheld since it was established in 1925. Clearly, Caterpillar’s Code of Conduct provides the backbone of their values-based culture that spans across the globe.[[21]](#endnote-21)

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| CATERPILLAR’S WORLDWIDE CODE OF CONDUCTINTEGRITY -- The Power of HonestyIntegrity is the foundation of all we do. It is a constant. Those with whom we work, live and serve can rely on us. We align our actions with our words and deliver what we promise. We build and strengthen our reputation through trust. We do not improperly influence others or let them improperly influence us. We are respectful and behave in an open and honest manner. In short, the reputation of the enterprise reflects the ethical performance of the people who work here.eXCELLENCE -- The Power of QualityWe set and achieve ambitious goals. The quality of our products and services reflects the power and heritage of Caterpillar -- the pride we take in what we do and what we make possible. We are passionate about people, process, product, and service excellence. We are determined to serve our customers through innovation, continuous improvement, an intense focus on customer needs, and a dedication to meet those needs with a sense of urgency. For us, Excellence is not only a value; it is a discipline and a means for making the world a better place.tEAMWORK -- The Power of Working TogetherWe help each other succeed. We are a team, sharing our unique talents to help those with whom we work, live and serve. The diverse thinking and decision making of our people strengthens our team. We respect and value people with different opinions, experiences and backgrounds. We strive to understand the big picture, then do our part. We know that by working together, we can produce better results than any of us can achieve alone.commitment -- The Power of ResponsibilityWe embrace our responsibilities. Individually and collectively we make meaningful commitments -- first to each other, and then to those with whom we work, live and serve. We understand and focus on the needs of our customers. We are global citizens and responsible members of our communities who are dedicated to safety, care for our environment, and manage our business ethically. We know it is both our duty and our honor to carry the Caterpillar heritage forward. |

Figure 1. Caterpillar Worldwide Code of Conduct[[22]](#endnote-22)

According to Jim Owens, Chairman and CEO of Caterpillar, “the Code of Conduct is the most important thing we ever produced at Caterpillar. Its purpose is not to provide a set of rules that covers every situation or challenge we may face, but to serve as a daily guide for putting our values in action…and how to make sound, ethical decisions in the best interests of all Caterpillar stakeholders.”[[23]](#endnote-23) Around the world Caterpillar people put, excellence, integrity, teamwork and commitment into action every day in all they do. The Code of Conduct is Caterpillars foundation of who they are.

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**Enterprise Strategy and Vision 2020**

The second observation Col Hurry made about Caterpillar’s success was that their entire 2010 strategic planning cycle was based on helping their customers succeed. Although the resulting Enterprise Strategy, known as Vision 2020, was outstanding in and of itself, what Col Hurry found most impressive was how they went about developing the strategy. In May of 2010, Vice Chairman and CEO–Elect Doug Oberhelman led their effort and took the entire administrative counsel to Clinton, IL to see one of their biggest customers -- Peoria Disposal Landfill (PDL). Together, they talked about their strategy and what it meant to be going forward. Cat leadership talked to a valued customer about their industry and the challenges they faced. They found out about more about what PDL (and other companies like them) needed from CAT so they can be successful and how Cat’s continued commitment could help them grow their business for their next generation. What Caterpillar leadership realized was that by renewing their intense focus on the customer, they will set the stage for what they want to accomplish in their own strategy.

Figure 2. Vision 2020

In addition to unveiling the updated Vision 2020, highlighted in Figure 2, the CEO-elect took this a step further and challenged his leadership team to lead by example with their customers. “I expect our leaders to be out in the field, shaking hands and listening to our customers. I expect all of us to take a hard look at where we are spending our time and energy. Is the work we are doing really adding customer value and driving results? Are you holding yourself accountable to deliver best quality with a sense of urgency every single minute?”[[24]](#endnote-24) The leadership team came away from this experience energized and inspired, but they realized they can’t do everything. So, they decided to prioritize and focus on a few key tasks that provided the most value to their customers...the result: Caterpillar’s new focus was now on quality, production capability and cost.

**Trough Planning and the Bullwhip Effect**

Clearly the global economy during 2009 wreaked havoc on the majority of companies and business; however, Caterpillar survived because of the implementation of perhaps one of the best strategic plans ever created…Caterpillar’s Trough Plan. This plan was a result of the 2005 Strategic Planning cycle where leadership began to worry about a possible economic downturn. While they clearly did not expect the severity of 2008 & 2009, they never-the-less proactively developed the Trough Plan in case they needed to quickly reduce costs and increase liquidity. In doing so, they would be positioned to change and adapt more quickly to a difficult economic environment should one arise.

Unfortunately, Caterpillar had to begin executing their Trough Plan in 2008 in an effort to mitigate the impact of the global economic crisis. The plans included reductions in executive pay, voluntary and involuntary layoffs, and freezes on hiring and salaries. There was a full blown effort to reduce inventories, increase turn times and cut material costs. In fact, the company lowered inventory by over $3 billion in total reductions by the end of the 2009. Employee’s overtime work and week length were reduced with some plants being shut-down temporarily. For example, the Motor Grader Production facility in Decatur, IL was shut down for the entire month of July in 2009. As a result of these actions, Caterpillar was able to obtain $32 billion in sales and revenue in 2009 in spite of the extremely tough economic period.[[25]](#endnote-25) Chairman and Chief Executive Officer Jim Owens stated:

I am “pleased with our profit given the severe economic environment and with our sales well below end-user demand as dealers continue to aggressively draw down inventories. Our primary focus continued to be on trough management and operational execution. We lowered production as dealers continued to cut inventories, we reduced costs, maintained positive **price realization**, lowered inventory, delivered positive operating cash flow and improved our financial position. I'm confident that Team Caterpillar, supported by our strong dealers and suppliers, can leverage our comprehensive lineup of products and services to improve our leadership position as we move from recession to growth."[[26]](#endnote-26)

The company worked hard to minimize the impact of the economic crisis and they were extremely successful. Because of their proactive Trough Plan, Caterpillar was able to maintain solid profitability and cash flow and improve their balance sheet. They were also able to maintain their credit ratings and dividend rates, make pension contributions and continue selective investment in new products and capacity.[[27]](#endnote-27)

 Perhaps what was equally as impressive as Caterpillar’s Trough Plan was their proactive approach to direct materials procurement and supplier management so that they could minimize the impact of a phenomenon known as “the bullwhip” effect. A “bullwhip” occurs where “small increases in demand cause a big snap in the need for parts and materials further down the supply chain"[[28]](#endnote-28) Because of this, Caterpillar has been extremely involved in monitoring the operations of suppliers to insure that they can meet increased demand in 2010 even if the economy is slow to recover. For example, "Caterpillar told its steel suppliers that it will more than double its purchases of the metal this year -- even if the company's own sales don't rise one iota." Because they significantly reduced their inventory in 2008 and 2009, Caterpillar said that "even if demand for its equipment is flat this year, it would still need to boost production in its factories by 10% to 15% just to restock dealer inventories and meet ongoing customer demand” which would mean “CAT's suppliers would have to increase production 30% to 40% just to keep their production lines running." If, however, there was a 15% spike in demand, CAT's suppliers would have to "more than double their shipments."[[29]](#endnote-29)

Because of these forecasts, Caterpillar went to great lengths to insure they minimized the impact of the bullwhip effect particularly in comparison to their competitors and other industrial manufacturers, many of which share the same supply chains and supply bases. Therefore, Caterpillar began visiting its key suppliers (approximately 500 suppliers representing 80% of manufactured parts) "to ensure they had the resources to quickly boost output" and prepare them for the anticipated onslaught of new purchase orders that would soon be coming. Additionally, Caterpillar began to help finance the supply chains of their suppliers, by “offering a new program that allows suppliers to borrow money from a bank, against their receivables, at a favorable interest rate. This means they can tap the loan funds within five days of delivery of goods to Caterpillar—as opposed to a typical 60-day wait." Caterpillar also agreed not to change order volumes for a period of three months under a new "freeze period" plan. This gave their suppliers a greater ability to plan ahead and persuade banks to increase their financing, since there would be guaranteed business during that three-month span.[[30]](#endnote-30)

**New Product Introduction (NPI) Process**

The final area that was extremely impressive at Caterpillar was the fact that they have only one product development process – called their New Product Introduction or NPI process. NPI is a very structured, standardized approach Caterpillar uses to develop products and services to meet customer expectations world-wide, up and down the product lines. It is clearly a best-in-class process that allows them to respond quickly, effectively, and profitably to major, technology-forcing changes. And, this process is used across the entire company regardless of whether they are working on a large construction machine, an industrial engine or a subsystem like a fuel system or a transmission in support of one of their prime products.

Caterpillar’s NPI process is based on balancing the proverbial “three-legged stool” – time, cost, and quality. All three are extremely important to both the customer and the business. For example, it isn’t going to do anyone any good if Caterpillar develops a low-cost, top-quality product for Tier 4 Interim … but can’t deliver it until 2013. Likewise, they don’t want a low-cost product that meets the federal timelines, but does not meet Cat’s quality requirements. Therefore, the purpose of NPI is to put equal emphasis on all three legs of the stool – Time, Cost, and Quality

The NPI process also has many benefits. The first benefit is a common NPI language. For example, when system and sub-system teams talk to prime product teams, or when different disciplines within a team talk about the issues, they all speak the same language. In addition, the criteria CAT uses to judge the viability of programs are all the same throughout the company, which allows them to identify which programs should continue and which should be “tabled” or cut. The NPI process also has standardized “gateway” reviews that require specific topics to be briefed at each review. This makes it easier for the presenter and the product managers know what to expect and can look at the various metrics and instantly know what they mean.

The key to the NPI process is that it gets everybody headed in the same direction and working together to deliver excellent results. Employees, customers, dealers and suppliers are involved throughout the process; they all communicate to the central NPI strategists with feedback on how the process is working and what would make it better. Caterpillar also uses their “Voice of the Customer” inputs to start their NPI strategy and requirements process. When it’s all said and done, they are able to deliver the best-quality product, on time, and on cost.

**Recommendations**

The kind of people we seek might be described as those having the capacity to learn. We want people who, as a natural code of conduct, like to pursue excellence in all that they do. The success of the enterprise is based on the work and ability of its people.

William Blackie, Former CEO and Chairman of Caterpillar, Inc

Obviously not all of the observations from Caterpillar this year will have a direct correlation to the Department of Defense, but there are several recommendations that were gleaned from this experience that could very easily be implemented within the DoD. The first is to develop more in-house functional experts in the support arena. The second recommendation is to develop a more robust education program in terms of relationship management, change management and strategic communications. The final recommendation is that each of the Services should implement some form of 360°/Peer review. Each of these recommendations will be discussed in more depth in the following paragraphs.

Col Hurry’s first recommendation deals with developing more functional experts in the support career fields. The DoD does a very good job in this area at least from an operational perspective…after all we have the best rated officers, special operators and intelligence specialists in the world…they are without a doubt, functional experts. But, if you take a closer look at the support career fields, our focus is more on our breath of knowledge rather than depth of knowledge. This is something that really jumped out at the Fellows because if you looked at the companies participating in this program, the companies that were most successful in terms of innovation and dealing with the changing environment, were the ones who made sure they had functional experts running their Design, Engineering, Procurement, Human Resources and Logistics functions. Apple computer was particularly impressive in this area. They hire the absolute best people with the most expertise for their particular function and then pay them extremely well, because that is where they are going to stay. There is very little upward mobility. Likewise at Caterpillar, of the 90K plus employees within the company, only about 300 folks are “designated as high potential” and those are the folks that will move around every 2-3 years, become more generalists and receive the education they need to be Caterpillar’s executive leaders. Everyone else is expected to do their particular job or task better than anyone else in the industry.

The DoD, especially the Air Force, tends to take a slightly different approach. If the DoD needs a particular expertise in the support arena, we generally hire a contractor to do it. Outsourcing our some of our key functions, such as acquisitions, logistics, operations research or analytics, or engineers is a rather dangerous proposition particularly as we look towards the future and our budget begins to tighten. The DoD isn’t going to be able to afford all of these contractors and we’ll be forced to bring it back in-house…only to find we have very limited internal capability and almost no expertise. Therefore, Col Hurry’s first recommendation is to identify some of these additional core competencies and develop internal functional experts so they can help the DoD innovate.

The second recommendation Col Hurry has for the DoD is that we need to increase our education on areas that focus on organizational effectiveness particularly in terms of relationship building, change management and strategic communications. One of the common factors of all of the companies highlighted when speaking of their organizational structure was that the key to their success was the strengths of their relationships and partnerships. It didn’t matter whether the company had an extremely flattened structure like Apple, or a matrixed organization like DuPont or Caterpillar, they all took a more decentralized, networked approach to leadership. These companies were successful only if their network, customers and their partners were successful, therefore, they all focused on developing strong relationships and developing unity of effort. The DoD isn’t any different. As the DoD looks to cut overhead, streamline staffs and possibly implement some form of matrixed organizations, they must also become better at building relationships. Therefore, the DoD needs some education in this area...they must learn how to develop a mutual trust between organizations. Unfortunately, this education doesn’t really exist today.

The second type of education that isn’t readily offered within the DoD deals with change management, which is rather odd considering the amount of change the Department does. The DoD is constantly trying to transform or cut costs, eliminate waste, improve processes, and streamline/reorganize yet there is little to no education on how to effectively implement these changes.

The Air Force’s Smart Operations for the 21st Century (AFSO21) Program is a perfect example of where change management skills would be highly effective. Like Caterpillar, the Air Force understood the need for innovation and continuous improvement. In fact, in June 2009, the Secretary and Chief of Staff of the Air Force signed a joint memorandum to highlight their commitment to AFSO21. This program, like Caterpillar’s “Six Sigma” or NPI programs, is the Air force’s fundamental transformation program designed to continually improve the efficiency and effectiveness of our processes and performance. It “identifies performance gaps; allows Airmen to find innovative and effective ways to accomplish the mission; and brings everyone together to solve problems, exploit opportunities and maximize efficiencies.“ Because of the tremendous benefits of this program, Gen. Stephen Lorenz, commander of Air Education and Training Command, had directed that each professional military education program contain curriculum and learning objectives of AFSO21-LSS to help implement these processes and provide a conduit for change.[[31]](#endnote-31)

What the Air Force (or rest of DoD for that matter), has not done, however, is include change management education in our professional military education courseware. Change management could help institutionalize AFSO21 principles and help facilitate the required change in the Air Force Culture. Clearly, the AFSO21 education is a great start, but one of the biggest lessons learned from Caterpillar and the other companies within the SDCFP program is that if change is not implemented in a structure way and communicated from the top down, the new programs will have an extremely tough time succeeding. Industry has proven that the structure provided by effective change management practices really helps facilitate the implementation of new and transformational ideas. Therefore, Col Hurry’s recommendation is to limit outsourcing change management to contractors and, instead, provide the military and civilian leaders with some education on the subject so that they also know how to successfully implement change.

Finally, Col Hurry believes the DoD needs to increased their emphasis on strategic communications. If one considers the increase in networking and social media and the speed of information transfer today, the DoD really needs to ensure all of their personnel are educated in strategic communications, not just the Public Affairs professionals and most senior leaders. With today’s technology, information simply can not be contained; therefore all DoD personnel must know, understand and internalize the fact that because of the speed of information flow, the things they say can have strategic implications very quickly.

The last recommendation Col Hurry has deals with the DoD performance feedback and appraisal system. It would be extremely beneficial to implement some form of 360° review for both military and civilians. Having feedback from subordinates, peers and supervisors can send a very powerful message and can be a very effective tool in improving one’s effectiveness as a leader. Although the DoD does conduct a 360°/Peer assessment for many of its senior civilian and Flag/General Officer, Col Hurry’s recommendation is to include all of its personnel, starting with the company grade and field grade officers and non-commissioned officer corps. Caterpillar, DuPont and several other SDCFP companies this year use some form of the 360° review to improve their leadership performance and it has worked very well for them. In fact, it has also worked well in several of the companies that supported this fellowship program in the past, because the recommendation to implement a 360° review in the DoD has been made by several year-groups.

**Chapter 4**

General Dynamics

*TRUSTED – Core to Edge.*

—General Dynamics C4 Systems Motto

General Dynamics was formed in 1952 by combining Electric Boat Company, Canadair Ltd and other smaller companies. Today, General Dynamics is one of the world’s largest defense contractors with a diverse portfolio of products and services provided to all branches of the US military and other allied nations. The company is divided into four distinct business groups – Aerospace, Combat Systems, Marine Systems and Information Systems and Technology. The Aerospace group includes Gulfstream Aerospace Corp., General Dynamics Aviation Services and Jet Aviation. They produce the Gulfstream family of business jets and provide aviation service support at various locations around the globe. Combat Systems group designs and produces a full array of major ground combat vehicles from the Army M-1 Abrams and Stryker Armored Combat Vehicle to the Marine Expeditionary Fighting Vehicle. Marine Systems develops and builds submarines, surface combatant ships and combat-logistic ships for the US Navy. The Information Systems and Technology Group has an extremely diverse portfolio of products and services supporting all branches of the DoD. Products include tactical and strategic mission systems specializing in all types of C4ISR applications, information technology and mission services, and highly specialized intelligence mission systems for space and land-based applications.[[32]](#endnote-32)

Company History[[33]](#endnote-33)

General Dynamics has gone through numerous changes since the company was founded in 1952. The Electric Boat Company, founded in 1899 was the predecessor to General Dynamics. Despite great success and profit building naval vessels for World War II, the company quickly realized after the war they needed to diversify into more than just shipbuilding. When CEO John Hopkins bought Canadair in 1946, he argued the company needed to change its name to suit their more diversified portfolio. Electric Boat officially changed its name in 1952 to General Dynamics to better reflect the marine and aviation products it now offered.

The company continued to grow and diversify through numerous acquisitions in aviation, marine and space sectors over the next 30 years. The economy, Cold War and varying levels of management competency took General Dynamics on a roller-coaster ride of success and near-failure. Notable purchases during this period include Cessna, and space rocket builder Convair. The F-111 Aardvark, F-16 Fighting Falcon, M-1 Abrams, *Ohio* and *Los Angeles* Class Submarines were major weapons systems built during the 1970s and 1980s. The US Navy A-12 Avenger program was a major failure in the aviation division and litigation is ongoing into 2010.

The 1990’s brought about another large restructuring of General Dynamics as the military aviation division was sold to Lockheed, Cessna sold to Textron and Convair sold to McDonnell-Douglas. The company then used proceeds from these sales to acquire companies that complemented their marine and land systems divisions. Then, in the late 1990’s, General Dynamics jumped back into commercial aviation with the purchase of Gulfstream and numerous smaller acquisitions that were eventually combined into the Information Systems and Technology unit. A total of 19 companies were acquired from 1994 to 2001. General Dynamics continues to focus on adding information technology acquisitions in the new millennium while also looking for opportunities in each of the other primary business units. Potential DoD budget cutbacks remain a major concern for the company going forward.

Company Today

General Dynamics placed at #69 on the most recent Fortune 500 list. They had $31.9 Billion in revenue and $2.4 Billion in profits in 2009. General Dynamics currently ranks at #5 in the Aerospace and Defense Industry Sector behind only Boeing, United Technologies, Lockheed Martin and Northrop Grumman. The company has 91,700 employees, this equates to $346,500 of 2009 sales per employee. General Dynamics does an excellent job of integrating acquisitions into the organization while letting them keep their identity. In short, although General Dynamics has a large number of employees, the company does an excellent job realizing their diverse workforce.[[34]](#endnote-34)

The corporate office at General Dynamics is more of a “holding company” with a small staff at headquarters. Most of the major decision making is pushed to the presidents of the respective business units. This concept allows each business unit and their respective sub-units more flexibility to pursue major DoD programs with less bureaucracy early in the decision-making process. General Dynamics also has the unique advantage of an extremely diverse product portfolio which allows increased efficiencies if numerous types of technologies are required on one platform. For example, their Information Systems and Technology unit can integrate C4 technologies and crypto into systems their Combat Systems or Marine Systems units are building. The potential for a shrinking DoD budget and unpredictability of the acquisition process are causes of long-term concern for the company.

Fellow’s Assignment

Colonel David Hicks was assigned to three different divisions within General Dynamics C4 Systems (GDC4S) in Scottsdale, AZ. GDC4S is a division of the Information Systems and Technology unit of General Dynamics. Col Hicks spent three months with the Business Development and Strategy Divisions of the Communications and Networking Division (CND), Battlefield Management Systems Division (BMSD), and Information Assurance Division (IAD). He had access to senior executive leadership, including Chris Marzilli, President of GDC4S, down to the engineers working on specific programs. Col Hicks was exposed to numerous projects in various stages of production or development.

He attended numerous conferences, meetings and high-level discussions to better understand the issues and decision matrix used in making proposal decisions for DoD programs. His operational experience also helped engineers better understand the operational environment of all branches of the DoD in order for them to have a clearer picture of requirements. Col Hicks was provided the opportunity to see the acquisition process from the contractor perspective and understand the challenges the civilian sector faces. He also worked directly with OSD in the requirements development of the next generation combat search and rescue (CSAR) radio.

 Observations

Col Hicks focused on what issues/problems a large DoD contractor saw from their perspective with regards to acquisition in its current state and how business leadership made decisions in the very flexible, unknown environment of a DoD budget. His attendance at numerous conferences allowed an opportunity to meet and talk with executives from other large DoD contractors and various personnel inside DoD itself. Col Hicks had numerous observations and realizations during his fellowship but will focus only on the following three observations: 1) DoD contractors are desperate for user/operator inputs to engineers and developers as early as possible during weapon system design and development; 2) business executives do superior job at understanding 2nd and 3rd order effects of major business and budget decisions; 3) the USAF may not be providing our young communications officers with the correct skill sets needed to be effective in the rapidly evolving technology age. The following paragraphs will discuss each of these observations in greater detail.

Col Hicks rapidly realized the insatiable thirst DoD contractors have for operator input during program design and development of proposed new DoD procurement programs. The primary reason is not to gain some type of unfair advantage over competitors; it comes from the engineers wanting to better understand the written requirements and how exactly a proposed system will function in its operational environment. DoD program offices often provide written requirements of what a proposed system should do, but seem to do a poor job of explaining the full operational environment a system will operate in and how it will be used. As an example, engineers can build a hand-held radio that meets every size, weight and power spec a requirements document calls for but the radio is unusable with gloves on, or its display cannot be read in certain conditions, or its operation is not intuitively obvious to a user who is under extreme duress or hostile fire.

 The tight budget environment DoD will live in over the upcoming years means there is no room for failed programs or multiple “spirals” of technology for initial program requirements. DoD must work harder to ensure all competitors fully understand what is needed and not be “snowed” by unnecessary add-ons which are not specified in the requirements documents.

Col Hicks noted the outstanding ability of senior executives at General Dynamics to efficiently assess the various 2nd and 3rd order effects of deploying money and resources towards a pursuit of a new program. These effects include, but are not limited to, what Internal Research and Development (IRAD) may have to be cut, what other contracts may not be pursued due to lack of money or engineering expertise, and what updates on current programs may have to be scaled back. This assessment process happens every day at General Dynamics as they try to maximize productivity with a finite amount of resources available.

The military decision matrix is usually based on mostly mission accomplishment, often with little regard towards money or long term impact on resources used. Col Hicks firmly believes mission always comes first but DoD leaders must be smarter with budget and resource management at lower levels. As stated earlier, the future DoD budget crunch demands critical thought by leadership at all levels as to how both capital and resources are deployed in order to maintain superiority over potential adversaries.

After attending numerous conferences during the year, Col Hicks perceived a lack of proper training for USAF officers in the communications field. Communications has historically concentrated on base infrastructure, computer networks, phones, airfield communications with local air traffic. The last 10 years have dramatically changed what is happening in the communications area of expertise. The advent of air and ground datalinks, immediate C2 data passed from command nodes to air and ground assets, and IP-based networks force the Comm career field to better understand how these networks are used in a tactical environment and the resulting infrastructure requirements. USAF Comm officers are often overwhelmed with requests from operators when the various links mentioned above are degraded. However, without the proper training and understanding of the mission impact, these officers don’t fully understand the networks or the repair priority.

Recommendations

The DoD is at a budgetary crossroads where new programs have no room for error and must be done right the first time, on time. Contractors need access to operators as requirements are defined and articulated early in program development. One way to accomplish this is to bring the various DoD Labs more in line with finding solutions to current operational needs and using operator inputs to help both labs and contractors understand the requirements. Col Hicks discussed DoD Labs and their contributions with numerous contractors and uniformed DoD operators. Nearly all perceived the overall products the labs were producing were not aiding the warfighter in an efficient or timely manner. One solution would be to streamline the labs based on areas of functional expertise as opposed to each service having numerous labs with overlapping areas of research. This would allow labs to be more focused and the acquisition experts a specific point of contact based on operational areas of need. Contractors would also have a single point of contact for expertise during research and development of new concepts and programs.

USAF needs to instill more rigorous training that includes budgetary considerations and potential longer-term impacts on resources to our officer corps and mid to senior level NCOs. The focus should always be accomplishing the mission first but with an eye to the possible future impacts each course of action may include. Our professional military education does an outstanding job with leadership training and development but is lacking with respect to combining leadership and good managerial skills/techniques into one skill set.

Col Hicks believes the USAF should take an in-depth review of what exactly a Communications career officer should be trained and ready to accomplish. Historically these officers have had little exposure to tactical/operational execution of air and space power. The proliferation of datalinks and IP-based networks in the tactical arena are now forcing comm personnel to understand the immediate impact they can have in the battlespace.

Chapter 5

Conclusion

The Defense Department must take a hard look at every aspect of how it is organized, staffed and operated -- indeed, every aspect of how it does business.

—Robert Gates, Secretary of Defense

Remarks to the U.S. Army Command and General Staff College

Ft. Leavenworth, Kansas.

7 May 2010

When Secretary Gates challenged the Department of Defense during his presentation to the Army Command and General Staff college earlier this year, Col Hicks, Col Hurry and Lt Col Spangenthal couldn’t help but look back on what they were asked to do during the course of this fellowship: observe extremely successful businesses as they struggled to reshape their organizational structures and methods of operations so they could continue to innovate and maintain a competitive advantage in spite of the extremely tough economic period. In doing so, the Fellows were able to glean unbelievable insights into the best of change, innovation, and leading edge business practices that could be implemented to transform DoD just as Secretary Gates directed. Therefore, the recommendations presented throughout this paper (which were also briefed to many senior leaders throughout the Department) attempted to capture these observations so that the DoD could have additional options to innovate better and streamline or optimize its own processes, organizational structures and procedures.

While clearly the Secretary of Defense Corporate Fellowship Program provided an exceptional avenue for the DoD to gain insight into corporate challenges and solution sets, arguably the greatest payback was the personal experience the Fellows gained. It was absolutely tremendous. Throughout the year, the Fellows were often asked by the senior leaders at Apple, Caterpillar and General Dynamics, “So are you learning anything?” The answer was always unequivocally, “Yes, absolutely.” As such, Colonel Dave Hicks, Colonel Linda Hurry and Lieutenant Colonel Bill Spangenthal would like to express their personal thanks to their respective sponsor companies for graciously sharing their insights and experiences and making this Fellowship an unbelievably rewarding experience, both personally and professionally.

Glossary

AFFP Air Force Fellows Program

AFSO21 Air Force’s Smart Operations for the 21st Century

BMSD Battlefield Management Systems Division

C2 Command and Control

Cat Caterpillar, Inc

CEO Chief Executive Officer

CND Communications Networking Division

Comm Communications

DoD Department of Defense

GDC4S General Dynamics C4 Systems

IAD Information Assurance Division

NPI New Product Introduction

OSD Office of the Secretary of Defense

SDCFP Secretary of Defense Corporate Fellows Program

SecAF Secretary of the Air Force

SecDef Secretary of Defense

UASs Unmanned Aerial Vehicles

USAF United States Air Force

Endnotes

1. Most of this paragraph is derived from Apple, Inc.’s standard corporate description on most investment websites. [↑](#endnote-ref-1)
2. This entire section is derived from http://en.wikipedia.org/wiki/Apple\_Inc [↑](#endnote-ref-2)
3. Apple’s Form 10-Q located at http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9Mjc1MjJ8Q2hpbGRJRD0tMXxUeXBlPTM=&t=1 [↑](#endnote-ref-3)
4. http://247wallst.com/page/real-time-500/ [↑](#endnote-ref-4)
5. Apple’s Form 10-Q located at <http://phx.corporate-ir.net/External.File?item=UGFyZW50SUQ9Mjc1MjJ8Q2hpbGRJRD0tMXxUeXBlPTM=&t=1>, pg. 30. [↑](#endnote-ref-5)
6. Ibid [↑](#endnote-ref-6)
7. “Good to great: Why some companies make the leap--and others don't”, 2001 Harper Collins, NY, NY, pg 1. [↑](#endnote-ref-7)
8. <http://www.pragmaticmarketing.com/publications/magazine/6/4/> you\_cant\_innovate\_like\_apple [↑](#endnote-ref-8)
9. Ibid. [↑](#endnote-ref-9)
10. http://odam.defense.gov/omp/pubs/guidebook/Pdf/DoD.PDF [↑](#endnote-ref-10)
11. <http://www.uavforum.com/library/librarian.htm> [↑](#endnote-ref-11)
12. Dow Jones Averages; http://djaverages.com. Dow Jones & Company. 2010. [↑](#endnote-ref-12)
13. Dow Jones Averages, Dow Jones Industrial Average Components: http://djaverages.com. Dow Jones & Company. 2010 [↑](#endnote-ref-13)
14. http://www.cat.com/corporate-overview/history [↑](#endnote-ref-14)
15. Ibid [↑](#endnote-ref-15)
16. Ibid [↑](#endnote-ref-16)
17. Ibid [↑](#endnote-ref-17)
18. http://www.cat.com [↑](#endnote-ref-18)
19. Caterpillar, Inc., 10-K, US Securities and Exchange Commission [↑](#endnote-ref-19)
20. http://www.cat.com [↑](#endnote-ref-20)
21. http://www.cat.com/code-of-conduct [↑](#endnote-ref-21)
22. http://www.cat.com/code-of-conduct [↑](#endnote-ref-22)
23. Caterpillar Code of Conduct Handbook [↑](#endnote-ref-23)
24. Webcast on Enterprise Strategy, Doug Oberhelman, Vice President and CEO-elect [↑](#endnote-ref-24)
25. Caterpillar 2009 Annual Report [↑](#endnote-ref-25)
26. Caterpillar Quarterly Earnings Report, 4th Quarter 2009 [↑](#endnote-ref-26)
27. Caterpillar 2009 Annual Report [↑](#endnote-ref-27)
28. Aeppel, Timothy,”'Bullwhip' Hits Firms as Growth Snaps Back,” Wall Street Journal, 27 Jan 2010. [↑](#endnote-ref-28)
29. Ibid [↑](#endnote-ref-29)
30. Ibid [↑](#endnote-ref-30)
31. Air Force Leadership Emphasize AFSO21” Carl Bergquist, Air University Public Affairs, 9/29/2009 [↑](#endnote-ref-31)
32. Most of this paragraph is derived from General Dynamics standard corporate description on most investment websites. [↑](#endnote-ref-32)
33. This entire section derived from <http://www.answers.com/topic/general-dynamics-corporation> [↑](#endnote-ref-33)
34. <http://money.cnn.com/magazines/fortune/fortune500/2010/snapshots/169.html> [↑](#endnote-ref-34)