Strategy Research Project

WHAT HAPPENED TO FCS? AN ORGANIZATIONAL CHANGE CASE STUDY

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WHAT HAPPENED TO FCS? AN ORGANIZATIONAL CHANGE CASE STUDY

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WHAT HAPPENED TO FCS? AN ORGANIZATIONAL CHANGE CASE STUDY

On October 12, 1999 General Eric Shinseki, the recently appointed Chief of Staff of the Army, announced a new vision for the Army and started the Army down the path of transformation.[1] Based on the Army's experiences in Bosnia and Kosovo in the 1990s, General Shinseki identified the need for the Army to become more deployable. He identified a gap in capability between the Army's rapidly deployable light force that lacked lethality and survivability against armored threats and the Army's lethal and survivable heavy force that was too heavy to deploy quickly and required an excessively large logistics tail with it in theater. To enable the Army to fill this gap, General Shinseki announced an aggressive plan for the Army to quickly add an interim medium weight force while working toward an objective force that would be as lethal and survivable as the heavy force, but would be much more rapidly deployable, with a goal of deploying one brigade anywhere in the world in 96 hours, a division in 120 hours, and five divisions in 30 days.[2] General Shinseki announced a target of fielding the interim force within a year, and the objective force before 2010.

The Future Combat Systems (FCS) program would be the centerpiece of the Army's efforts to field the objective force. FCS would remain "the core of the Army's modernization effort"[3] until 2009. General Shinseki knew this vision was aggressive, and he took many actions to build momentum for the vision in order to bring it to reality.[4] Despite these efforts to build momentum, the FCS program did not achieve its intended purpose. Secretary of Defense Robert Gates announced a major restructuring of the FCS program in 2009 that effectively killed the program.[5]

In the end, General Shinseki's attempts to build irreversible momentum for his aggressive vision did not work. Many would point out that the vision of transformation did not survive the conflicts of the 21st century. Secretary Gates himself pointed out that "the FCS vehicles … do not adequately reflect the lessons of counterinsurgency and close quarters combat in Iraq and Afghanistan."[6] This paper will use Kotter's framework for organizational change to analyze the implementation of this transformation effort, and will discuss reasons why the FCS program failed. It will address organizational and structural reasons for the failure of the program, and will point out why the Army itself could not see that the original objective force vision lost relevance given America's experience in Iraq and Afghanistan.

Background

To fully understand FCS and the objective force concept, one must place it in its context. General Shinseki's vision drew from the experiences of the Army in the 1980s and 1990s. During the cold war, the Army had organized and equipped itself with heavy tanks, infantry carriers, and artillery to defeat the threat of a Soviet armored invasion of Western Europe. After the fall of the Berlin wall in 1989, the Army reduced in size, but did not significantly reorganize or re-equip for a new operational environment. The Army's great success against Iraq in 1991 during Operation Desert Storm was seen by many as vindication of the Army's force design and tactics and reinforced the idea that the Army was well equipped to dominate threats on the battlefield.

In the 1990s, the Army was called on to conduct a series of different kinds of actions. Operations in Somalia, Bosnia, and Kosovo (as well as the early stages of Operation Desert Shield in Saudi Arabia) exposed the Army's inability to rapidly deploy

heavy firepower. Some felt that this lack of strategic mobility would limit the Army's ability to contribute to national defense.[7]

At the same time that the operational Army was learning lessons about the importance of deployability, the entire military was wrestling with the idea of a "Revolution in Military Affairs." The idea that breakthroughs in information technology would enable an entirely new way of warfare was very prevalent in the military.[8] *Joint Vision 2010*, the Chairman of the Joint Chiefs of Staff General John Shalikashvili's 1996 vision for the future depended on taking advantage of revolutionary technologies. *Joint Vision 2010* described a future where the U.S. military would rely on information superiority and long range precision strike to dominate its adversaries. Technology would allow the U.S. to rely on networked lethality rather than massed forces.[9]

While the Chairman was developing a joint vision for the future, the Army was also looking to see what was coming next. The Army After Next project[10] was a significant effort led by the Army's Training and Doctrine Command (TRADOC) that took place through the 1990s and tried to determine how the Army could best support future wars. Like Joint Vision 2010, the Army After Next project talked about revolutionary technologies enabling the Army to dominate the full spectrum of military activity. While "Full Spectrum Dominance" was a watchword for both the Joint and Army visions, rather than explore concepts against all parts of the spectrum, the largest of the joint experiments and Army After Next wargames were based in a world where the military was fighting and defeating other state military threats.[11] Experimentation was focused at the high end of the spectrum of warfare with only limited discussion given to other forms of conflict.

Concurrently, key politicians embraced these ideas of military transformation. On September 23, 1999 as a candidate for President, George W. Bush gave a seminal speech at the Citadel where he outlined his plan to focus military modernization efforts.

> We will modernize some existing weapons and equipment, necessary for current tasks. But our relative peace allows us to do this selectively. The real goal is to move beyond marginal improvements – to replace existing programs with new technologies and strategies. To use this window of opportunity to skip a generation of technology. This will require spending more – and spending more wisely. [12]

Candidate Bush called for the military to take advantage of the relative peace at the end of the century in order to execute a momentous leap forward in technology.

In this environment General Shinseki was appointed Chief of Staff of the Army in 1999. The Army had recently proven strategically deliberate and slow, and futurists and experimenters were envisioning a world where information technology could enable a small dispersed force to use the precise application of force to defeat our adversaries on the battlefield. In this context the Army issued General Shinseki's new vision for transformation. The end state of this vision would be the objective force equipped with FCS.

Objective Force Overview

The key objective force concepts were described in General Shinseki's November 2001 White Paper, *Concepts for the Objective Force*,[13] This paper describes a force that is "more strategically responsive, deployable, agile, versatile, lethal, survivable and sustainable"[14] The objective force would gain these advantages by what was known as "a quality of firsts." Army units would "*see first, understand first, act first and finish decisively* at the strategic, operational, and tactical levels of operation."[15] Networked sensors and information would allow forces to avoid contact with the enemy

until the time and place of their choosing.[16] This network would enable the objective force to always have the initiative, and allowed the force to trade away the traditional armored protection that made heavy forces so slow to deploy for information-enabled protection.

Concepts for the Objective Force did not describe actual materiel requirements for objective force units, but was intended to describe the necessary capabilities and technologies to an audience that included the government, defense industry, and the scientific community.[17] The concept described how the Army intended to operate the objective force; the development community was expected to develop the necessary technologies and build a force capable of executing the concept.

The Army stood up a number of organizations to define, develop, and field the objective force. The embodiment of the concept was the FCS program, a "system of systems." FCS included systems designed to equip an entire brigade combat team, networked together to deliver the objective force capabilities.[18] The FCS program originally consisted of 18 manned or unmanned systems plus the network required to link the systems and to enable information dominance.

A Framework for Analyzing Organizational Change.

The Objective Force and the FCS program were a monumental effort to transform the Army that consisted of fundamental changes to both equipment and tactical operating concepts. Large organizations pursuing major changes have attracted much research from organizational theorists. One of the most popular frameworks for assessing organizational change efforts was developed in the 1990s by John Kotter at Harvard Business School.[19] Kotter studied why organizations fail to successfully implement changes and developed eight stages for successful change.

These eight steps are shown below in Table 1. The following section of this paper will apply Kotter's framework to the Army's implementation of the FCS program and will point out steps the Army did well, and areas where the Army did not follow Kotter's framework.

1.	Establish a Sense of Urgency
2.	Create a Guiding Coalition
3.	Develop a Vision and Strategy
4.	Communicate the Change Vision
5.	Empower Broad-Based Action
6.	Generate Short-Term Wins
7.	Consolidate Gains and Produce More Change
8.	Anchor New Approaches in the Culture

Table 1: Kotter's 8 Steps to Transforming an Organization[20]

Kotter's Framework Applied to the Objective Force and FCS.

In his 1999 speech, General Shinseki described a vision for transformation with the aggressive goal of having the first objective force units fielded and equipped by 2010. 2010 has come and gone without objective force units. In fact, the underlying FCS program was restructured and effectively killed. This reality begs the question of why the vision was not achieved. This section of the paper will use the steps from Kotter's framework for change to assess Army transformation efforts and the FCS program.

Establish a Sense of Urgency. The Army's sense of urgency developed out of its experience in the 1990s. The inability to deploy survivable heavy forces quickly during Operation Desert Storm and the deployment challenges experienced by Task Force Hawk in Kosovo led Army leaders to believe they needed a lethal and survivable force

capable of rapid deployment. As Chief of Staff of the Army, General Shinseki exhorted the rest of the Army to share this urgency. He used multiple venues to expound on the need for the Army to transform. The Army vision, posture statements and discussions during General Shinseki's many visits to Army units and installations were used to spread the sense of urgency. He used comments like "If you dislike change, you're going to dislike irrelevance even more,"[21] to inculcate the sense of urgency in the Army.

While General Shinseki and other Army leaders believed that strategic responsiveness required urgency, others were not convinced. Some argued that this was precisely the wrong lesson to learn from the Army's experiences of the 1990s. In an article in Military Review, three RAND analysts argued that assumptions about the strategic need for rapid deployment were questionable.[22] Others suggested that while the Army may need some rapid response units, it was very unlikely that the entire Army would need the capability, and questioned the urgency of these drastic changes.[23]

While there was some dissension on the need for change, General Shinseki was able to imbue most of the Army with a sense of urgency. Many in and around the Army did see the operation in Kosovo, where airpower was dominant in achieving victory and Army forces were too slow to deploy as threatening to the Army's relevance. This did create a sense of urgency that some change may be required to ensure the Army was relevant in the future.[24] By Kotter's model, the Army had successfully established an urgent need to change.

Coalition for Change. Kotter's change model describes a number of qualities required of effective change coalitions. Coalitions must include all key players responsible for the effort being changed to prevent the blocking of progress by those

outside the team. They must have enough expertise about the important issues at hand to enable quality decisions. Groups must have credibility with internal and external audiences so that change pronouncements are acted upon and not ignored. Finally they must include enough proven leaders to drive the process to success. Coalition members need both leadership and management expertise.[25]

General Shinseki was careful to include others in his coalition and worked hard to expand his coalition. He did not want the vision to be solely associated with him. In 2000, he told interviewers for a PBS video on the future of war,

> It's important in any organization that if visions have any reality at all, it's because the organization believes that the vision is right and that they share in it. Otherwise it becomes the good idea of one person, and that even more importantly contributes to the sense that it will not survive the departure of that individual. So this is the Army's vision. And it's my responsibility is to give it momentum, to educate and to inform, and to get a buy-in from the rank-and-file and from the very top. One of my senior generals said that every last driver and soldier in a tank turret and truck should understand it and believe that's what needs to be done.[26]

General Shinseki employed several subordinate Army organizations to help him push toward change. Chief among these was the Army's Training and Doctrine Command (TRADOC). As the Army headquarters responsible for combat development of both doctrine and materiel requirements, TRADOC assumed responsibility for large parts of the transformation effort.[27] GEN John Abrams led the TRADOC team that conducted and synchronized Objective Force development and defined and integrated FCS concepts.[28] TRADOC was at the center of the Army's change coalition.

An Army decision early in the FCS program to ensure irreversible momentum would have long term effects on the coalition for change. The entire FCS program with all of its systems and all of its complexity was contained in a single line in the Army budget. By maintaining FCS in one budget line much of the scrutiny FCS would have

faced if each of the subsystems had had lines in the budget was avoided. FCS was always considered as a complete system, and Army staff scrutiny of individual subsystems was not allowed. While individual systems inside the FCS program may not have provided incremental benefit compared to other competing Army systems, this level of analysis was never conducted. The Army could not do tradeoff analysis for options such as replacing one of the FCS UAVs with an existing Army UAV system. By making this decision, key organizations in normal Army processes were left out of the change coalition. Since they did not review the program, they were not brought into the group pushing the change.

While the Army was transforming and developing FCS, the Army Staff went through its own dramatic reorganization. The Army established a new staff section, the Army G8 as the Deputy Chief of Staff for Programs in 2002. This new staff section included the existing Program Analysis and Evaluation Directorate (PAED) underneath the G8.[29] The Army Director, PAE is responsible for the development and defense of the Army Program Objective Memorandum (POM) and the Future Years Defense Program (FYDP) and for the independent assessment, integration, and synchronization of the Army Program. PAED has oversight of the resourcing of all Army programs. This restructure and redesign of the Army staff changed how an organization with critical staff oversight functions reported to the Chief of Staff of the Army. Turbulence in structure required time for the staff to figure out the impact and how they were to report to each other. Restructuring the Army staff at the same time the Army was implementing one of its most complex and costly procurement programs couldn't help

but cause challenges to staff integration, and made the creation of a cohesive coalition difficult.

Even as the Army staff was working through challenges coming from reorganization, General Shinseki established special procedures for how the FCS program worked through the Army staff. In most programs, the Army G3/5/7 has to validate requirements, and the Army G8, with the help of PAED, sets the program and budgeting levels. During the process of requirement validation and program development, the Army staff scrutinizes programs and provides oversight to ensure they are meeting Army needs and are funded in accordance with Army priorities. The FCS program did not go through this scrutiny. To build the irreversible momentum and avoid dissent, the FCS program reported through the military deputy to the Assistant Secretary of the Army (Acquisition, Logistics, and Technology) (ASA(ALT)) directly to the Chief of Staff of the Army. FCS did not have to go through the normal requirement and resource processes and skipped the normal scrutiny provided by generals and colonels on the Army staff.[30] In order to build speed and momentum into the program, General Shinseki removed the oversight that might have identified poorly defined requirements and unrealistic cost and affordability estimates. Reduced oversight compounded the problem. In an effort to build speed, key players were left out of the change coalition.

While the alteration of important Army processes made it difficult to include some key players on the change coalition may have excluded some key players, significant resistance to change continued to exist both outside of and within the Army. Outside the Army, influential skeptics would publish articles critical of the need for change.

These critics argued that the Army was applying the wrong lessons from Kosovo and Desert Storm and that building the whole Army for unnecessary strategic responsiveness may be shortsighted and unnecessary.[31]

Inside the Army, initial resistance centered within the armor community, which saw the effort to trade away armored protection as an attack on their heritage and history.[32] General Shinseki, himself an armor officer, attempted to include this group in his coalition in multiple ways. He described and championed transformation efforts at the annual armor conference in 2000.[33] The Army gave the Armor Center and its Battle Lab the responsibility for advancing the Objective Force concept and building the design and requirements.[34] These efforts at co-opting centers of resistance would have mixed success.

The Army's change coalition did include experts with credibility within the organization and the authority to push change forward. Senior leaders throughout the Army played important roles in furthering the transformation vision. Outside the Army, however, particularly in Congress, skeptics remained about Transformation.[35] While General Shinseki was able to mobilize a coalition within the Army, resistance from important stakeholders would never go away completely. From the perspective of Kotter's change model, the failure to bring powerful dissenters into the change coalition limited the possibility of successful change from the beginning.

Develop a Vision and Strategy. In Kotter's change model, successful change requires a top-quality vision and strategy. Kotter defines six elements of a successful vision. First, the vision must be imaginable; it must describe a future environment. Second the vision must be desirable and appeal to all required stakeholders. Third the

vision must be feasible, with realistic, attainable goals. Fourth the vision must be focused in order to provide guidance to subordinate decision makers. Fifth, the vision must be flexible to respond to changes in conditions. Finally, the vision must be easy to communicate.[36] While the Army Vision for FCS successfully incorporated some of these elements, significant problems existed with others.

General Shinseki spent a lot of effort developing the Army vision. It was a clear description of the future that could easily be envisioned by all stakeholders. The Transformation vision consisted of three main elements. A legacy force consisted of existing Army light and heavy combat units that would support national requirements while the Army transformed. A rapidly fielded interim force would quickly add a more deployable medium weight capability to the Army's portfolio. In the longer term, the Objective Force, the strategically responsive, deployable, agile, versatile, lethal, survivable and sustainable force enabled by information dominance, would replace both legacy and interim capabilities in Army force structure.[37] Figure 1 is the Army's graphical depiction of its transformation strategy. This vision clearly conveyed a view of the future and was imaginable by those who saw it.

Different points of view existed within the Army whether or not this vision was desirable. While many believed in the need for the medium weight Interim Force in the transformation trident, many, particularly in the Armor community, rejected the Objective Force and its underlying premise that the Army should exchange all of its armored protection for a networked force. Letters in the Armor professional journal after General Shinseki announced the vision clearly showed that a strong cohort within the Army did not desire the changes.[38]

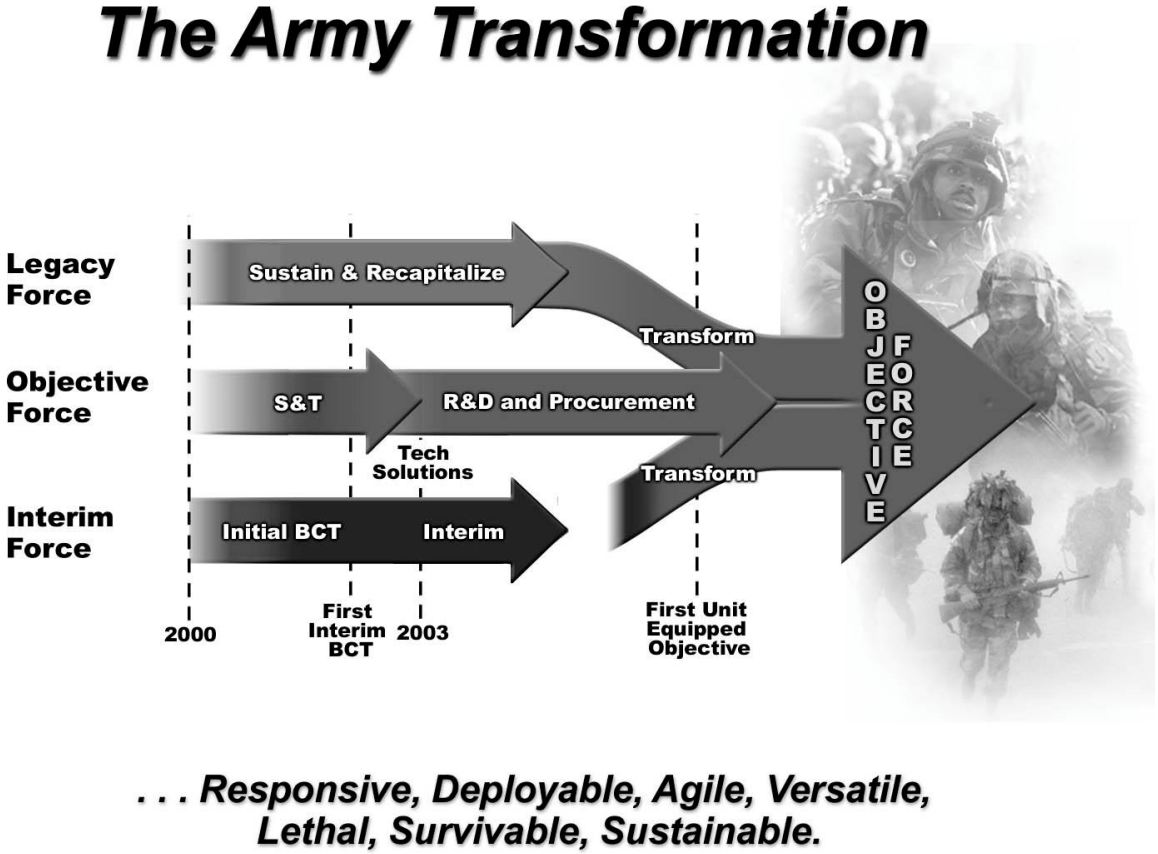

Figure 1. Army Transformation Roadmap[39]

The primary problem for the Objective Force Vision was its feasibility. General Shinseki's vision for a strategically responsive force that could deploy a division within 5 days and five divisions within 30 days was not possible given existing and planned deployment methods. In fact a 2002 RAND study that assessed the ability to deploy one brigade in 96 hours found,

> The Army cannot meet its deployment goals if it depends only on strategic airlift. The combination of the allocation of airlift that the Army can reasonably expect to receive and the infrastructure limitations in the places it can expect to fight means that only relatively small units –a battalion task force—can deploy extremely rapidly. Even a dramatic expansion of the airlift fleet will often have no effect on shortening deployment times because airport throughput is often the limiting factor. [40]

While others were conducting conceptual work to look at deployment options that might overcome the limitations of airlift, these ideas never progressed beyond the drawing board.

In addition to questions about the feasibility of deployability goals, others have found that the quality of firsts with its assumption of understanding the enemy was unachievable from conception.[41] Recent U.S. experience in Iraq and Afghanistan demonstrates the fallacy of attaining perfect information. The ability of sensors to "see first", particularly when the adversary takes countermeasures against these sensors is very limited.[42] The U.S.'s technological advantage in armored battle has forced its adversaries to adapt. Adversaries have exploited cover and concealment, complex terrain, and interspersing with local populations to limit the ability of these sensors. General Martin Dempsey, commander of TRADOC in 2010, noted,

> Some of the assumptions we've made about technology and its ability to deliver 'the quality of firsts' (see first, understand first, act first) have just not been realized because our adversaries, and potential adversaries, understand what it takes to deliver 'the quality of firsts' and have taken action to prevent it.[43]

The original Objective Force vision was too optimistic and did not effectively account for adversary countermeasures. The objective force concept relied on reducing the weight of systems by increasing platform survivability through superior information. In order to meet General Shinseki's announced deployability goals; the force shed armor in the belief that superior technology would provide protection. When technology proved incapable of providing perfect information on the battlefield, giving up armored protection was much more risky. Key assumptions about technology were not met, and the "quality of firsts" was not achievable.

From the beginning, General Shinseki acknowledged the naysayers that called the vision too ambitious. He countered that a vision this ambitious "required bold and decisive action to sustain and build on momentum."[44] This faith that bold action can overcome challenges was well-intentioned but may have been misplaced. While General Shinseki's goal for fielding the interim force based on current technology could benefit from decisive action, developing and fielding the objective force was a different story. Only an immature concept when the vision was announced, FCS systems were not yet described let alone defined. Requirements that enable the acquisition community to deliver needed capabilities did not exist and significantly, technologies did not exist anywhere to accomplish some of the goals described in the objective force concept. General Shinseki's vision and concept were not incremental change, but were revolutionary, "skipping a generation of technology" as President Bush had discussed, and required considerable increases in technological capabilities. General Shinseki pushed the world toward an objective that exceeded the technical capabilities of the time.

One of the consequences of an ambitious vision was high technological risk. The DoD policy preference for acquisition programs is for new technologies to be at Technology Readiness Level (TRL) 7 prior to starting product development.[45] To reach TRL 7, a system must demonstrate a prototype in an operational environment. When the FCS program was eventually initiated in 2003, none of the critical technologies were at TRL 7.[46] The Army was assuming a lot of risk by moving forward relying on unproven and untested technologies.

The transformation vision did not have a singular focus. While the transformation vision culminated in the objective force, the trident spread the focus across three efforts. This three-pronged approach diffused Army efforts and spread priorities across the force.

The transformation vision was not flexible to changes to the underlying assumptions. The terrorist attacks of September 2001 radically changed the strategic environment in which General Shinseki outlined his vision in October 1999. The U.S. soon committed itself to military operations in Afghanistan and Iraq that have continued for the last nine years. Rather than a strategic pause in which to make revolutionary change to the Army, the Army now found itself in what the current Chief of Staff of the Army General George Casey calls the era of persistent conflict that should continue for the foreseeable future.[47] The "window of opportunity to skip a generation of technology"[48] had slammed shut and the Army was committed to a demanding current fight that was drawing resources and attention from the vision for the future. Army leadership needed to strike a balance between funding current operational requirements and funding transformation. When General Peter Schoomaker replaced General Shinseki as Chief of Staff of the Army in 2003, he restructured the FCS program to put more emphasis on the current fight and to bring some technologies into the current force earlier in the acquisition process. This restructuring also delayed the eventual fielding dates for FCS technologies.[49]

Additionally, the environment for which the FCS was envisioned and designed, fighting state threats armed with traditional military equipment, seemed less likely as the decade progressed. With the Army fighting counterinsurgencies in Iraq and Afghanistan

where the largest threat was improvised explosive devices, FCS may have been designed for the wrong fight. While the FCS program tried to show how the FCS would be effective against insurgencies, requirements did not keep up with the current environment. Secretary Gates's concerns that FCS did not incorporate lessons from Iraq and Afghanistan are symbolized by the fact that FCS did not incorporate the IED threat into system requirements.

While the change vision lacked feasibility, focus, and flexibility, it was communicable. The vision for change represented by the trident chart was frequently communicated to many different audiences. The Army sent leaders across the force to transmit this message.[50] Using Kotter's framework, the vision was imaginable and may have been desirable, but it was not feasible. Its lack of focus detracted from execution. While not inherently inflexible, in practice, the vision lacked flexibility to respond to different threats. While the vision was communicable, the failure in other areas made vision a critical error in the change process.

Communicate the Change Vision. Kotter's framework requires that an organization successfully communicate its change vision in order for change to succeed. Kotter lists seven key elements to the effective communication of the vision. These are simplicity; metaphor, analogy, and example; multiple forums; repetition; leadership by example; explanation of seeming inconsistencies; and give-and-take.[51] The Army successfully applied most of these elements to the FCS and objective force vision.

The Objective force vision was simple, and included extensive use of metaphor and analogy. Regardless of whether it was feasible, the "quality of firsts" did use a clear

metaphor for what the objective force would be able to do. The use of scenarios and stories were key elements of the effort to describe the future force.[52] The vision was repeated by Army leadership frequently and in many different venues. The main error in communicating the vision was in the lack of give and take. Army efforts to communicate the vision often played down legitimate criticism of the vision as merely resistance to change rather than considering the critiques on their merits. General Shinseki's implication that those opposed to this change would have to face irrelevance tended to stifle debate and avoided facing legitimate concerns about the vision. The vision may have been wrong, but respect for authority kept skeptics from speaking out loudly within the system. Like the townspeople in the classic children's story "The Emperor's New Clothes," who praised the Emperor's finery even though he was naked, few spoke up to say, "The FCS concept is ill defined, technically risky, and cost prohibitive." Some of this failure is undoubtedly due to Army inhibitions to dissent.[53] In his book, Kotter says that give and take with dissenters is a vital part of communicating the vision. He states, "The downside of two-way communication is that feedback may suggest we are on the wrong course and that the vision needs to be reformulated."[54] While this is a downside to achieving the change, this give and take can identify misguided vision early in the process. By belittling and marginalizing the vision's critics, General Shinseki may have prevented the identification of the vision's shortcomings.

Empower Broad-Based Action. Kotter's fifth step in successful change efforts recognizes the importance of allowing many people to work separately to enact the change by decentralizing execution and removing barriers to the implementation of the

vision.[55] Once an organization recognizes the urgent need to change and accepts the vision, subordinates must be empowered to enact the change.

Within the Army, acquisition programs have historically focused on one system like a tank or a truck or a rifle. To achieve the Objective Force vision, the Army established the FCS program which was focused on the acquisition of most of the systems required to achieve the objective force vision. FCS used a "system of systems" approach that combined many systems into one program. To guide the pursuit of the vision, in 2001 the Army established the Objective Force Task Force (OFTF) to conduct the functions of a traditional Army proponent. Proponents develop requirements and represent the concerns of the end user within the acquisition process. Historically, the TRADOC schools and centers have performed this role for the specific warfighting functions they represent. For example, the Artillery Center is the proponent for Army artillery organizations, systems, and munitions, and the Engineer Center is the proponent for engineer organizations and systems. By consolidating proponency in the OFTF for all FCS warfighting functions, the Army reduced the role of the traditional proponents.[56] The TRADOC schools had an additional layer of bureaucracy above them, and did not have their usual power or responsibility to take action to enact the change.

The OFTF was empowered to make many decisions with respect to the objective force vision and the FCS. The OFTF had different responsibilities than a traditional proponent. It was tasked not just with resolving issues, developing operational and system design concepts, and conducting technology/requirements tradeoffs. The OFTF was also responsible for publicly pushing the transformation vision.[57] The program

office and the OFTF often acted as advocates for the program, tasked specifically to "sell" Transformation and FCS to a skeptical audience in OSD and Congress.[58]

The OFTF's role as advocates and salesmen effected how others perceived their traditional proponent work and may have tainted some of that work as "booster-ism." Additionally, the traditional proponents have staff members with a wealth of experience in their areas of expertise and a clear understanding of their role in the Army's acquisition process. Other parts of the Army, like the materiel development community and the Army staff are organized to interact with these traditional proponents in the acquisition process, and the OFTF had difficulties establishing these key relationships across the Army.[59] The uniqueness of the OFTF made broad-based action difficult.

The complexity of the FCS program made widespread buy-in difficult to achieve. This "system of systems" approach drastically increased the complexity of the program and of the organizations responsible for executing the program.[60] Increased complexity made it much more difficult to manage details of the program. One of the problems with such a large program is that it can tend to minimize opportunities for innovation and competition within the defense industry.[61] Traditionally in the private sector, innovation and change is best accomplished in smaller corporations that are competing for market share. Since these smaller companies do not have the capacity or experience to work on such a large program, using one single program as opposed to separate programs for each system tended to stifle the innovation required to develop the needed technologies.

Significantly, the Army's choice to use a Lead System Integrator (LSI) to assist with managing the FCS program also limited broad-based action. Early in the FCS

program, the Army decided that it did not have the in-house capacity to manage such a large and complex program. To assist with program management, Army leaders chose to outsource key FCS development tasks to an industry partner serving as the LSI. The LSI would develop the system of systems architecture, perform systems engineering and integration, and supervise the procurement of each of the FCS platforms.[62] The Army selected Boeing and SAIC to be the LSI for the FCS program. Outsourcing these tasks was a relatively new concept in the defense acquisition world, and the Army chose this method both because of the lack of in-house capacity, and the greater flexibility allowed by such a program. Unfortunately, the implementation of the LSI suffered many challenges because the Army did not have experience with using a LSI, Army Acquisition culture clashed with that of Boeing and SAIC, and the lack of planning for roles and responsibilities of the government and the LSI caused problems in program execution.[63] Additionally, Congress did not feel the use of an LSI allowed enough government oversight of the program.[64] When Boeing was caught acting unethically in unrelated defense acquisition programs, the FCS program came under additional congressional scrutiny.[65] Outsourcing inherently governmental key development tasks to industry limited the Army's ability to manage the broad-based action required to bring the vision to reality.

Friction between the Army and the LSI also may also have contributed to the Army's inability to identify problems in the program. The use of an LSI was new to the Army and cultural differences between Army acquisition employees and the LSI slowed information exchange. People on both sides of the divide resented their interaction and had difficulty communicating with one another.[66] This caused some challenges in

information sharing, and did lead to oversight issues noted by the Government Accountability Office.[67] Problems with government oversight of the LSI may have impacted the Army's ability to identify technical issues with the program.

Cost growth in the FCS program and the resource needs of current fights in Iraq and Afghanistan made the large FCS program an attractive target to pull money from. Congress reduced the budget for the FCS program approximately ten percent per year in 2006, 2007 and 2008. Each time this occurred, the program office had to replan their program and timelines continued to push out into the future.[68] The program office and the Army Staff disagreed on the meanings of these restructurings. The program office believed that cuts would be made up from funds within the Army budget, while the Army Staff believed the program office needed to deliver the program with allocated funds.[69] The lack of power to institute the vision is embodied in this disconnect between the Army staff and the program office.

Existing structural impediments as well as decisions about how to run the program create road blocks to broad based action. Kotter points out that removing these structural barriers is the most important step to empowering collective action.[70]

Generate Short-Term Wins. Short-term wins are visible, unambiguous successes clearly related to the change effort.[71] Kotter offers six roles for these short-term wins. First, they show that result of the change is worth the cost. Second, they reward those who are working hard for the change with evidence of success. Third, they provide feedback on the viability and direction of the change. Fourth, short-term wins undermine resistance to change by making it difficult to be a naysayer. Fifth, they

sustain support of management (and in this case, OSD and Congress), and finally, they build momentum, by gathering more people onto the change bandwagon.[72]

General Shinseki's overall transformation vision had a built in short-term win. The interim force, eventually embodied in the Stryker Brigade Combat Team, was clearly designed to be a short-term win for transformation. While it was a visible and unambiguous success, its relationship to the final vision and the objective force was questionable. The Stryker effort was a separate leg of transformation, and did not reinforce the requirement or desirability of the objective force.

The FCS program itself was not initially designed for short term wins. One of the consequences of an ambitious vision and the lack of a traditional proponent was a non-stable set of requirements. Stable requirements are critical for industry to meet delivery timelines for Army capabilities. Requirements drive system development and are what delivered systems are measured against. Because the FCS program was born as an immature concept, requirements were never stable. From an acquisition perspective, systems acquisition requirements should be set before program initiation. Materiel cannot be produced without clearly defined requirements for what it must do. For FCS, requirements were not set until much later as the Army spent much of the early years of the program working to explore and define the concept. Initial requirements definitions continued to change as the concept was developed and matured. The unstable requirements were like changing the architect's blueprints in the middle of constructing a building. Shifting requirements made it impossible to quickly field capabilities and made it difficult to achieve a quick win. The lack of stable requirements resulted in cost growth and was a big part of why Congress and others were always skeptical of the

FCS program.[73] General Shinseki's strategic vision did not get translated down into the details required to implement it, limiting the ability to show progress.

The fact that the FCS program did not include all of the required objective force technologies also made it difficult to achieve progress and show quick wins.[74] The system relied on over 50 complementary programs, new systems that were required to work with FCS to accomplish the objective force vision. Most importantly, the network, at the center of FCS and the key to information dominance, relied on two new systems outside of the FCS program. These complementary programs, the Joint Tactical Radio System (JTRS) and the Warfighter Information Network – Tactical (WIN-T), would provide the means for the objective force to communicate and share information. These programs were "not synchronized with the FCS schedule and face(d) their own technical, funding, and requirements challenges."[75] These programs were themselves revolutionary changes to communications and suffered from extensive requirements and cost growth. Additionally, the instability of FCS requirements made integration of these systems difficult.[76] Since FCS depended on the network for all of its efficiencies and new technologies, delays to the programs providing the key network technology prevented the Army from demonstrating FCS technology. Building a system dependent on unfinished and unproven technologies made it difficult to generate a quick win.

Another challenge that made it difficult to generate quick wins was the inability of the Army to demonstrate the benefits achieved from use of new technology. The Army had difficulty expressing the advantages of the new force to a skeptical audience, and did not have appropriate analytic tools to clearly demonstrate the advantages provided by the proposed technologies.[77] Army analytic tools for combat development were

focused on platform based technologies, and had difficulty demonstrating the value for a system of systems. The Army found it difficult to measure and to communicate the cumulative effect the objective force would bring to the fight. The audience in the Defense Department and Congress was used to seeing scientific analysis of the benefit of individual systems, and was not accepting of analysis "more appropriately focused on the art" of war.[78]

When General Schoomaker replaced General Shinseki as Army Chief of Staff, he had the FCS program restructured to bring emerging technologies to the warfighter earlier in the timeline. These technology spin-outs were designed to quickly bring some of the benefit of FCS technology to the force and to build the momentum for FCS. Unfortunately, because of the immature technologies, these spin-outs required over six years to be ready for the force. This long delay made them irrelevant in sustaining momentum and reducing opposition. These spin-outs were not the "quick wins" of Kotter's model. In fact when the FCS program was restructured in 2009, most of these spinout technologies were cancelled. Those that live will not enter the force as originally envisioned.[79] The lack of short term wins did not allow the Army to mobilize its resources, reinforce its vision, or generate the momentum for change.

Consolidate Gains and Anchor New Approaches. Secretary Gates restructured the FCS program before anyone had the opportunity to consolidate its gains and to anchor the change in the Army. The Secretary of Defense recognized that the vision was no longer desirable. For many of the reasons already discussed, transformation did not deliver on its promise. The Army's change effort failed before it could reach these stages. Performance of the last two steps of Kotter's model cannot be measured.

Assessment of Why the Army Couldn't Kill the Program

Given the problems within the program, the changes to the operational environment, and constrained budget environment, the program was challenged. In 2009, the Preliminary Design Review was scheduled and the Army would start spending procurement dollars. Annual expenditures were scheduled to increase dramatically. With all of these pressures on the program, one might think the Army itself should have identified the many problems and killed the FCS program itself. In fact, the Secretary of Defense was the one to announce restructuring and the killing of the FCS program.

Two factors may have contributed to the Army's inability to restructure the FCS program itself. First, as previously discussed, the Army's normal processes for scrutinizing the performance of programs were side stepped with FCS. The Army Staff processes to validate and complete requirements were not used for this program. The emphasis of Army leaders curbed natural skepticism within the Army that might have identified some of the problems with the system.

Finally, the defense budget process creates a political arrangement where Services have an incentive not to kill their own programs. If the Army killed the system for any reason, it may appear to others that the Army does not have a requirement that system was supposed to fill. Even if the reason the Army kills a system is because of cost or performance, the Army fears that if it kills the system, others may come after the money in the budget. DoD may redirect resources to other requirements or use the money to reduce the overall budget. The Services may feel that it is better if the system is killed by someone in the Office of the Secretary of Defense. This way, the Army can maintain that the underlying requirement still exists, and can pursue other programs to fill the need once the existing program is terminated.[80]

Conclusion

Changing the course of a large organization like the Army is difficult. The landscape is littered with unsuccessful change efforts. Kotter built his eight step model not by studying successful change attempts, but by identifying common mistakes in these failed change efforts.[81] He developed his eight steps by identifying eight common mistakes he found in a survey of large change efforts. His model has proven useful to identify those actions that contribute most to success of change efforts. Kotter argued that while the steps can overlap, success requires following all steps in sequence and not jumping the process before the proper groundwork has been layed.[82]

Kotter's model is helpful in identifying why the Army did not succeed in getting to FCS. Kotter identifies qualities of effective change efforts; he doesn't list measurable standards for his steps. Still, the conceptual framework he establishes can be used to identify specific ways that the Army leadership failed to effectively lead, manage, and advocate for this Transformation. Problems, ranging from minor to fundamental, existed with the Army's implementation of each of Kotter's steps, and applying the model to the FCS change process is a useful effort.

While there were flaws in establishing urgency and building the change coalition, enabling broad based action, and generating short-term wins, the fundamental error with the Army's road to FCS was a failure of vision. The vision was fundamentally infeasible. Technology could not deliver capabilities as described in the vision. The vision was too large and too ambitious. The vision's reach exceeded the Army's grasp. When the events of September 2001 ended the strategic pause that would allow the time to develop those technologies, the Army rightly focused on the current fights in Iraq and Afghanistan. This value of these changes to the current fights was never made

clear. By studying and scrutinizing these experiences the Army may be able to avoid missteps and better position itself for the future.

While the Army does not and will not have FCS or the objective force, it was able to achieve part of General Shinseki's transformation vision. The interim force is now the Army's Stryker brigade, a medium weight force that is more deployable than the heavy force and more lethal and survivable than the light force. By reaching for existing technologies and buying off-the-shelf platforms, the Army was able to succeed in accomplishing the intermediate goal of transformation.

While not as attractive as "revolutionary change," incremental change is more manageable and more robust to errors in the change process. Kotter's model is a useful tool that could have helped the Army identify its problems with the feasibility of its vision.

Endnotes

[1] Eric K. Shinseki, "Address to the Eisenhower Luncheon, 45th Annual Meeting of the Association of the United States Army (as prepared for presentation)," Washington D.C., October 12, 1999, accessed in The Eric K. Shinseki Collection, Box Number 85, the U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

[2] Ibid, 3.

[3] Stephen M. Speakes, *2008 Army Modernization Strategy*, (Washington, DC: Department of the Army Deputy Chief of Staff, G-8, July 25, 2008), 12, http://downloads.army.mil/docs/08modplan/Army_Mod_Strat_2008.pdf, (accessed November 3, 2010).

[4] Read-ahead package for General Eric Shinseki, "Transformation Conditions Review," April 9, 2002, accessed in The Eric K. Shinseki Collection, Box Number 77, the U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

[5] Robert M. Gates, "Defense Budget Recommendation Statement (as Prepared for Delivery)," Arlington, VA, April 06, 2009, http://www.defense.gov/speeches/speech.aspx?speechid=1341 (accessed November 3, 2010).

[6] Robert M. Gates, "Defense Budget Recommendation Statement (as Prepared for Delivery)," Arlington, VA, April 06, 2009, http://www.defense.gov/speeches/speech.aspx?speechid=1341 (accessed November 3, 2010).

[7] General Shinseki is quoted as having said "If you don't like change, you're going to like irrelevance even less." See Mackubin Thomas Owens, "Marines Turned Soldiers: The Corps vs. the Army." *National Review Online,* December 10, 2001, http://old.nationalreview.com/comment/comment-owens121001.shtml (accessed 3 February 2011).

[8] See for example Theodor W. Galdi, *Revolution in Military Affairs? Competing Concepts, Organizational Responses, Outstanding Issues*, (Washington, DC: Congressional Research Service, 1995), http://www.au.af.mil/au/awc/awcgate/crs/95-1170.htm (accessed December 1, 2010). For a discussion of FCS as a revolution in military affairs see Michael J. Kwinn and Mark Davis, *A Framework for the Analysis of the Future Combat Systems Conceptual Design Analysis*, (West Point, NY: Operations Research Center of Excellence, United States Military Academy, 2001).

[9] John M. Shalikashvili, Joint Vision 2010 (Washington, DC: U.S. Joint Chiefs of Staff, 1996), http://www.dtic.mil/jv2010/jv2010.pdf (accessed December 1, 2010).

[10] See for example Dennis J Reimer, "The Army After Next: Knowledge, Speed and Power," *Military Review: Tribute to General Dennis J. Reimer, Army Chief of Staff*, (May 1, 1999), 2-7; and Huba Wass de Czege, & Antulio J Echevarria II, "Landpower and future strategy: Insights from the Army after Next," *Joint Force Quarterly*, 21 (April 1999), 62-69.

[11] Huba Wass de Czege, "On Plotting the Course Ahead," *Army Magazine*, (February 2011), 20-22. This article describes some of the challenges with the Army's experimentation program in the 1990s and 2000s from the perspective of one of the frequent participants.

[12] George W. Bush, "A Period of Consequences" Speech delivered to the Citadel, Charleston, SC, September 23, 1999, http://www.citadel.edu/pao/addresses/pres_bush.html, (accessed November 3, 2010).

[13] Eric Shinseki, "United States Army White Paper: Concepts for the Objective Force", November 8, 2001, http://www.army.mil/features/WhitePaper/ObjectiveForceWhitePaper.pdf, (accessed November 3, 2010).

[14] Ibid, iv. These characteristics (deployability, agility, versatility, lethality, survivability, sustainability, and responsiveness) were known colloquially within the Army as "the –ilities," and were used to analyze and assess concepts and options during the combat development process.

[15] Ibid, italics in original.

[16] Ibid, 20.

[17] Ibid, ii.

[18] For a good overview of the history of the FCS program and how it was organized, see Helen M. Lardner, *The Army's Quest for a Ground Combat Vehicle*, Strategy Research Project, (Carlisle Barracks, PA: U.S. Army War College, March, 25 2010), Andrew Feickert, *The Army's Future Combat System (FCS): Background and Issues for Congress*, (Washington, DC: Congressional Research Service, updated May 5, 2006) and Bill Pettus, Jack Wong, and Arbi

Lazar, *Improving the Future of the Army's Future Combat Systems Program*, Joint Applied Project, (Monterey, CA: Naval Postgraduate School, June 2009).

[19] John P. Kotter, *Leading Change*, (Boston, MA: Harvard Business School Press, 1996).

[20] Ibid, 21.

[21] Mackubin Thomas Owens, "Marines Turned Soldiers: The Corps vs. the Army." *National Review Online,* December 10, 2001, http://old.nationalreview.com/ comment/comment-owens121001.shtml (accessed 3 February 2011).

[22] John Gordon, IV, David E. Johnson, and Peter Wilson, "Counterpoint: Air-Mechanization: An Expensive and Fragile Concept," *Military Review*, January/February 2007, 87, no.1, 63-73.

[23] Tom McNaugher, "Refining Army Transformation" in *The U.S. Army and the New National Security Strategy*, ed. Lynn E. Davis and Jeremy Shapiro, (Santa Monica, CA: RAND, 2003) 295.

[24] Michael Chandler, dir.,"The Future of War", (Boston, MA: Frontline and the Center for Investigative Reporting, Inc., 2000). http://www.pbs.org/wgbh/pages/frontline/shows/ future/ (accessed February 5, 2011) provides an excellent overview of the opinions at the time. Specifically, see http://www.pbs.org/wgbh/pages/frontline/shows/future/experts/taskforce.html (accessed February 5, 2011) for opinions from Ralph Peters, Lawrence Korb, Andrew Krepinevich, General Shinseki, and MG Dubik on lessons from TF Hawk and how they apply to the Army. All concur that it took too long for the Army to deploy in Kosovo, and the Army would have to adapt to be useful on the lower end of the range of military operations.

[25] Kotter, 57.

[26] GEN Eric Shinseki, interviewed for Michael Chandler, dir.,"The Future of War", (Boston, MA: Frontline and the Center for Investigative Reporting, Inc., 2000). http://www.pbs.org/wgbh/ pages/frontline/shows/future/interviews/shinseki.html (accessed February 5, 2011).

[27] Benjamin King, *Victory Starts Here: A 35-year History of the US Army Training and Doctrine Command*, (Fort Leavenworth, Kansas: Combat Studies Institute Press, US Army Combined Arms Center, 2008) 14.

[28] Ibid, 27.

[29] Headquarters, Department of the Army, *General Order Number 3: ASSIGNMENT OF FUNCTIONS AND RESPONSIBILITIES WITHIN HEADQUARTERS, DEPARTMENT OF THE ARMY,* (Washington, DC: July 9, 2002), 25, http://www.army.mil/institution/leaders/sma/docs/ go0203.pdf, (accessed 19 December 2010).

[30] Dr. Robert Steinrauf, Technical Director, Center for Army Analysis, interview by author, November 4, 2010. Dr. Steinrauf provided the author with unique insights from his many years serving as the colonel representing the Army G3 on the Army's Planning Program Budget Committee (PPBC) council of colonels. The PPBC process was used by the ARSTAF to review all army program and budget issues, and consisted of reviews at the O6, 2-star, and 3-star levels by representatives from Army G3, Army G8 and the Army Budget Office. These groups

were colloquially known within the Army as the 3 Kings, 3 Wise Men, and 3 Wise Guys (depending on the rank of the participants).

[31] See Tom McNaugher, 295.

[32] See for example, Don Loughlin, "Sayonara AGS? Sayonara Scout? Sayonara Armor?" *Armor,* Jul/Aug 1998; 107, no.4; 37 in Proquest (accessed February 6, 2011). The letters section in *Armor*, the journal of the U.S. Army armor branch contains many heated discussions after GEN Shinseki announced transformation. See in particular the first few issues of 2000 to read and understand how some in the branch viewed transformation as a personal attack.

[33] Harold Kennedy, "Army Approaches Decision on Interim Combat Vehicle," *National Defense*, September 2000, http://www.nationaldefensemagazine.org/archive/2000/September/Pages/Army_Approaches4329.aspx, (accessed February 6, 2011).

[34] MG B.B. Bell, "Welcome to the future at Fort Knox", *Armor*, Mar/Apr 2000; 109:2, 5. General Bell then commanded the Armor Center and discusses the pivotal role the Armor Center's Mounted Maneuver Battle Lab would assume in transformation in this article.

[35]See for example, Congressional Budget Office, *The Long-Term Implications of Current Defense Plans*, (Washington, DC: Congressional Budget Office, January 2003), 47-55.

[36] Kotter, 72.

[37] U.S. Government Accountability Office, *MILITARY TRANSFORMATION: Army Has a Comprehensive Plan for Managing Its Transformation but Faces Major Challenges*,(Washington DC: U.S. Government Accountability Office, November 2001) http://www.gao.gov/new.items/d0296.pdf (accessed February 5, 2011).

[38] The letters section in *Armor*, the journal of the U.S. Army armor branch contains many heated discussions after GEN Shinseki announced transformation. See in particular the first few issues of 2000 to read and understand how some in the branch viewed transformation as a personal attack.

[39] U.S. Government Accountability Office, *MILITARY TRANSFORMATION: Army Has a Comprehensive Plan for Managing Its Transformation but Faces Major Challenges*, 8. Within the Army, this chart was referred to as "the trident chart."

[40] John Gordon and David Orletsky, "Moving Rapidly to the Fight" in *The U.S. Army and the New National Security Strategy*, ed. Lynn E. Davis and Jeremy Shapiro, (Santa Monica, CA: RAND, 2003) 192. This chapter is based on analysis RAND did for the US Air Force published as Alan Vick, David Orletsky, Bruce Pirnie, and Seth Jones*, The Stryker Brigade Combat Team: Rethinking Strategic Responsiveness and Assessing Deployment Options*, (Santa Monica, CA:RAND 2002).

[41] For an excellent discussion of the myth of information dominance and the inability of military forces to acquire perfect information, see H.R. McMaster, *Crack in the Foundation: Defense Transformation and the Underlying Assumption of Dominant Knowledge in Future War*, Strategy Research Project (Carlisle Barracks, PA: U.S. Army War College, July 4, 2003).

[42] See for example, Stephen D. Biddle, *Afghanistan and the Future of Warfare: Implications for Army and Defense Policy*, (Carlisle, PA: Strategic Studies Institute, November 2002).

[43] LTC Mark Elfendahl, "Dempsey talks TRADOC future, institutional adaptation at AUSA," Feb 25, 2010, linked from the *United States Army Home Page* at "News Front Page" http://www.army.mil/-news/2010/02/25/34949-dempsey-talks-tradoc-future-institutional-adaptation-at-ausa/ (accessed 3 December 2010).

[44] Eric K. Shinseki, "Address to the Eisenhower Luncheon, 46th Annual Meeting of the Association of the United States Army (as prepared for presentation)," Washington D.C., October 17, 2000, accessed in The Eric K. Shinseki Collection, Box Number 77, the U.S. Army Military History Institute, Carlisle Barracks, Pennsylvania.

[45] For a description of Technology Readiness Levels see *Department of Defense Technology Readiness Assessment (TRA) Deskbook*, (Washington, DC: Director, Research Directorate (DRD), Office of the Director, Defense Research and Engineering (DDR&E), July 2009), 1-1, http://www.dod.mil/ddre/doc/DoD_TRA_July_2009_Read_Version.pdf, (accessed December 10, 2010).

[46] U.S. Government Accountability Office, *Defense Acquisitions: 2009 Is a Critical Juncture for the Army's Future Combat Systems*, (Washington, DC: U.S. Government Accountability Office, March 2008), 16.

[47] John M. McHugh and George W. Casey, Jr, *America's Army: The Strength of the Nation A Statement on the Posture of the United States Army 2010*, Posture Statement presented to the 111th Congress, 2nd Session, (Washington, DC: U.S. Department of the Army, 2010), 2.

[48] Bush, "A Period of Consequences".

[49] Lardner, *The Army's Quest for a Ground Combat Vehicle,*13.

[50] The author received the vision brief while a student at the Naval Postgraduate School in early 2000. LTG Kevin Byrnes, then serving as the Assistant Vice Chief of Staff of the Army, came to NPS and took the opportunity to brief all Army students in a mandatory briefing on transformation. Similar briefings and efforts occurred across the Army.

[51] Kotter, 90.

[52] U.S. Army Training and Doctrine Command Pamphlet 525-3-90/O&O, *The United States Army Objective Force Operational and Organizational Plan for Maneuver Unit of Action*, July 22, 2002 contained appendices which described FCS equipped objective force brigades fighting in different scenarios.

[53] For a discussion of how leaders can isolate themselves from the truth, see John Maver, "The Emperor's New Clothes in Business", http://ezinearticles.com/?The-Emperors-New-Clothes-in-Business&id=2261490, (accessed December 19, 2010).

[54] Kotter, 100.

[55] Kotter, 102.

[56] Lardner, *The Army's Quest for a Ground Combat Vehicle,*15.

[57] Ibid.

[58] Ibid.

[59] Ibid*,*15.

[60] Jeffrey Drezner, "Competition and Innovation Under Complexity," in *Organizing for a Complex World: Developing Tomorrow's Defense and Net-centric Systems*, ed. Guy Ben-ari and Pierre A. Chao, (Washington DC: CSIS, 2009), 33-34, http://www.rand.org/content/dam/rand/pubs/reprints/2009/RAND_RP1386.pdf, (accessed December 2, 2010).

[61] Ibid, p. 35.

[62] For a detailed discussion of why the Army chose an LSI and some of the challenges in implementation, see Scott Flood and Paul Richard, "An Assessment of the Lead Systems Integrator Concept as Applied to the Future Combat System Program", *Defense Acquisition Review Journal*, December 2005-March 2006, 355-373.

[63] U.S. Government Accountability Office, *Defense Acquisitions: Role of Lead Systems Integrator on Future Combat Systems Program Poses Oversight Challenges*, (Washington, DC: U.S. Government Accountability Office, June 2007).

[64] Ibid, 10-15.

[65] Scott Flood and Paul Richard, "An Assessment of the Lead Systems Integrator Concept as Applied to the Future Combat System Program", 369. The acquisition scandal referred to was in regard to the Air Forces Air-Refueling Tanker program. For a discussion of this scandal see: Government Accountability Office, *AIR FORCE PROCUREMENT: Protests Challenging Role of Biased Official Sustained,* (Washington, DC: U.S. Government Accountability Office, April 14 2005).

[66] Flood and Richard, "An Assessment of the Lead Systems Integrator Concept as Applied to the Future Combat System Program", 363-366.

[67] U.S. Government Accountability Office, *Defense Acquisitions: Role of Lead Systems Integrator on Future Combat Systems Program Poses Oversight Challenges*, 3-4.

[68] Lardner, 13-14. Lardner's paper contains a chart on page 14 that graphically depicts changes to the FCS program over time.

[69] Steinrauf.

[70] Kotter, 103.

[71] Kotter, 121-122.

[72] Kotter, 123.

[73] U.S. Government Accountability Office, *Defense Acquisitions: 2009 Is a Critical Juncture for the Army's Future Combat Systems*, 9.

[74] For a good discussion of challenges with Complementary systems, see Pettus, Wong, and Lazar, *Improving the Future of the Army's Future Combat Systems Program*, 29-31.

[75] U.S. Government Accountability Office, *Defense Acquisitions: 2009 Is a Critical Juncture for the Army's Future Combat Systems*, 3.

[76] Ibid, 23-24.

[77] See Rick O'Donnell, *FCS: Why the Army is Challenged to Show its Value*, Strategy Research Project (Carlisle Barracks, PA: U.S. Army War College, 28 March 2008), 31.

[78] Ibid, 6.

[79] For a discussion of FCS subsystems that survived initial cancelation of manned vehicles in 2009 see Kris Osborn, "FCS Is Dead; Program Lives On", Defense News Online, 18 May 2009, http://www.defensenews.com/story.php?i=4094484 (accesses February 28, 2011). For a discussion of cancelation of additional systems in 2011 see Henry Kenyon, "Army sheds more remnants of FCS program", Defense Systems Online, February 8, 2011, http://defensesystems.com/articles/2011/02/08/army-unmanned-ground-sensors-aerial-drone-fcs.aspx?admgarea=DS (accessed February 28, 2011) and Paul McLeary, "Analysis: Former FCS Continues to Adapt", AviationWeek.com, http://www.military.com/features/0,15240,226837,00.html (accessed February 28, 2011).

[80] Steinrauf.

[81] Kotter, ix.

[82] Kotter, 23.