

CRS Report for Congress

Military Transformation: Issues for Congress and Status of Effort

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Military Transformation: Issues for Congress and Status of Effort

Summary

This report assesses the status of military transformation across the Department of Defense and indicates issues of potential interest to Congress. Other CRS reports focus on individual Service efforts and functional areas. This report will be updated at least annually.

On September 23, 1999, at The Citadel Military College of South Carolina, then Texas Governor George W. Bush made military transformation a central theme in his campaign for President. In his words “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 in technology.” (George W. Bush. *A Period of Consequences*. The Citadel, South Carolina. September 23, 1999.) In 2001, President Bush re-emphasized transformation, three months after the 9-11 tragedy, adding special urgency to the effort. (George W. Bush. *President Speaks on War Effort to Citadel Cadets*. The Citadel, South Carolina. December 11, 2001.) Based on a changing world security environment coupled with a broader spectrum of military missions, his Administration has made transforming the Department of Defense (DOD), in particular the uniformed services, one of its priorities.

The push for transformation refines and accelerates a process underway for more than a decade. Dramatic advances in technology associated with the new field of information operations has formed a common thread binding most of the individual Services efforts in recent years. Research and experimentation have contributed to the potential range of possibilities available to the 21st century warfighter. Each Service department has approached transformation with its own vision and priority has been assigned to organizing those visions with an eye toward jointness and interoperability.

Congress has an interest in transformation efforts because current choices will shape defense programs and influence budgets for years to come. A great deal of debate has taken place on issues ranging from the Administration’s definition of transformation to the necessity, speed, and breadth of the current effort. Additionally, transformation is important to Congress because the Administration has made transformation a central theme in its national security policy and defense planning. The 2001 Quadrennial Defense Review followed by Defense Department and Service Chief annual reports and testimony to Congress have provided some insight into preparatory activities and potential transformation focus. The FY2004 defense budget submission has long been touted as the one of the primary instruments for outlining the Administration’s priorities and jump-start the re-shaped transformation process. In the coming months, Congress will have the opportunity to address various issues associated with defense and in particular military transformation.

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Military Transformation: Issues for Congress and Status of Effort

Introduction

Over a decade ago, the United States successfully liberated Kuwait in Operation Desert Storm. The war had gone well by both public and military assessment: few casualties and swift operations orchestrated by highly competent commanders. The aftermath brought a deluge of analytical studies suggesting the United States military had taken a leap forward in the execution of the military art. Defense writers hailed a revolution in military affairs, and wrote of a transformation in joint operations but the outcome was far from certain.¹ The National Security Strategy in 1991 carried the following quote, “In the emerging post-Cold War world, international relations promise to be more complicated, more volatile and less predictable. Indeed, of all the mistakes that could be made about the security challenges of a new era, the most dangerous would be to believe that suddenly the future can be predicted with certainty. The history of the 20th century has been replete with surprises, many unwelcome.”² The national focus shifted to globalization and national budgets reflected the public’s desire for a peace dividend coupled with concern for domestic revitalization. The military became caught up in post-war downsizing and reorganization, and faced world-wide contingency response challenges in many new forms. Peacemaking efforts and continued presence in Southwest Asia consumed operations and maintenance funds. Modernization was put largely on hold and the Services got by on hardware purchased to fight the Cold War.

On September 23, 1999, at The Citadel Military College of South Carolina, then Texas Governor George W. Bush made military transformation a central theme in his campaign for President. In his words “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 in technology.”³ In 2001, President Bush returned to The Citadel and re-emphasized the importance of transformation. The timing, three months after the 9-11 tragedy, added special

¹ Barry D. Watts and Thomas A. Keaney. *Gulf War Airpower Survey: Effects and Effectiveness*. General Printing Office. Washington, D.C. 1993. Thomas A. Keaney and Eliot A. Cohen. *Gulf War Airpower Survey: Summary Report*. General Printing Office. Washington, D.C. 1993.

² The White House. National Security Strategy of the United States. August 1991.

³ George W. Bush. A Period of Consequences. The Citadel, South Carolina. September 23, 1999.

urgency to his remarks.⁴ With a changing world security environment and a broader spectrum of military missions, this Administration has made transformation a key goal for the Department of Defense (DOD).

The push for transformation refines and accelerates a process underway for more than a decade. Dramatic advances in technology associated with the new field of information operations has formed a common thread binding most of the individual Services efforts in recent years. Research and experimentation have contributed to the potential range of possibilities available to the 21st century warfighter. Each Service department has approached transformation with its own vision and priority has been assigned to organizing those visions with an eye toward jointness and interoperability.

This Administration has presented its position on transformation through a number of official documents. The 2002 National Security Strategy formed the foundation by providing the military with a strategy for global security and a series of regional objectives. DOD and the Secretary of Defense have clarified the President's vision of a transformed force through the Quadrennial Defense Review (QDR), the Defense Planning Guidance, Nuclear Program Review, and the Transformation Planning Guidance. Each Service has now responded to the Department with their Transformation Roadmaps, highlighting individual Service plans and programs.

Congress has an interest in transformation efforts because current choices will shape defense programs and influence budgets for years to come. A great deal of debate has taken place on issues ranging from the Administration's definition of transformation to the necessity, speed, and breadth of the current effort. Additionally, transformation is important to Congress because the Administration has made transformation a central theme in its national security policy and defense planning. The 2001 QDR followed by Defense Department and Service Chief annual reports and testimony to Congress have provided some insight into preparatory activities and potential transformation focus. The General Accounting Office observed the QDR provided for a new defense strategy and applauded the push for transformation to meet future threats and adopt more efficient business practices. However, it also noted some weakness in its assessment of force structure and cited a lack of specific assumptions used to formulate strategy.⁵ The FY2004 defense budget submission reportedly will serve as an instrument to operationalize the Administration's priorities and put the Administration's stamp on a refined and accelerated transformation process. In the coming months, Congress is expected to address various issues associated with military transformation.

⁴ George W. Bush. President Speaks on War Effort to Citadel Cadets. The Citadel, South Carolina. December 11, 2001.

⁵ General Accounting Office. Report to Chairman and Ranking Minority Member, Committee on Armed Services, U.S. Senate. *Quadrennial Defense Review: Future Reviews Can Benefit from Better Analysis and Changes in Timing and Scope*. November 2002.

Defining Transformation

There are two general definitions of military transformation. The first defines it as a gradual change or evolution to a different form or function. A second emphasizes a more revolutionary approach, forsaking the current path in order to “leap” toward a new end. From a military perspective, transformation must provide a more competent and capable force to insure success in its increasingly complex mission. The current administration has adopted the second definition. Either way, Congress will be involved in shaping the definition and direction of military transformation.

President George W. Bush set forth his vision of military transformation at the United States Naval Academy commencement on May 25, 2001.⁶ In his address, he envisioned a “future force defined less by size and more by mobility and swiftness, one that is easier to deploy and sustain, one that relies more heavily on stealth, precision weaponry, and information technologies.” President Bush also stated, “building a 21st century military will require more than new weapons.” He spoke of a “renewed spirit of innovation in our officer corps.” In remarks in August of the same year, President Bush further defined transformation as “a process, not a one-time event.”⁷ This was the first time he addressed the “conflicting priorities” balancing current security responsibilities with transformation efforts. During questioning, the President outlined transformation as a “strategy and it starts with assessing the true threats facing America today and in the future.” The Administration views transformation as a continuing process, focused by a clear strategy, based on current and future national security requirements. This transformation would impact not only hardware, but people and employment concepts. A primary concern raised by many past attempts to define transformation had been a lack of overall specificity and a clear template for the Services to follow. This initial, quite possibly intentional, ambiguity allowed the Services and staff to experiment without bounds on the application of military force in the future. Given the role of architect for the administration military transformation efforts, Secretary of Defense Donald Rumsfeld reexamined the strategy requirement and further clarified the term.

Secretary Rumsfeld articulated the Administration’s view of military transformation in the 2001 Quadrennial Defense Review (QDR) and outlined tasks for the Services. In the QDR, DOD states, “Transformation results from the exploitation of new approaches to operational concepts and capabilities, the use of old and new technologies, and new form as of organization that more effectively anticipate new or still emerging strategic and operational challenges and opportunities and that render previous methods of conducting war obsolete or subordinate. Transformation can involve fundamental change in the form of military operations, as well as a potential change in their scale. It can encompass the

⁶The White House. Remarks by the President at the U.S. Naval Academy Commencement. Office of the Press Secretary. May 25, 2001.

⁷The White House. Remarks by the President and Secretary Rumsfeld in Announcement of Chairman and Vice Chairman of the Joint Chiefs of Staff. Office of the Press Secretary. August 24, 2001.

displacement of one form of war with another, such as fundamental change in the ways war is waged in the air, on land and at sea. It can also involve the emergence of new kinds of war, such as armed conflict in new dimensions of the battlespace.”⁸

The QDR-defined purpose of transformation is “to maintain or improve US military preeminence in the face of potential disproportionate discontinuous changes in the strategic environment.” Within this construct, DOD established six critical operational goals to focus military transformation and highlighted them to Congress in its 2002 Annual Report. The six operational goals are:

- Protect the U.S. homeland and our forces overseas
- Project and sustain power in distant theaters
- Deny our enemies sanctuary
- Protect our own information networks from attack
- Leverage information technology to link forces so they can fight jointly
- Maintain unhindered access to space and protect our space capabilities from enemy attack

President Bush emphasized his priorities by dedicating an entire chapter in his 2002 National Security Strategy to transformation.⁹ As a result, DOD views transformation more as a revolution than an evolution. The current term for evolutionary change appears to be modernization. This has led to some confusion because both terms, at times, have been used interchangeably by senior Pentagon officials.

General Richard Myers, Chairman of the Joint Chiefs of Staff, has stated transformation has intellectual, cultural, and technological dimensions. In his report to Congress last year General Richard Myers testified, “Technological change alone does not lead to transformation — intellectual change is also necessary. Transformation, therefore, must extend beyond weapon systems and materiel to doctrine, organization, training and education, leadership, personnel, and facilities. We need to foster a mindset that allows us to take advantage of both new ideas and new technologies.” Changes in operational concepts, the Services’ organization, individually and jointly, and procurement of new cutting-edge hardware might directly impact the nation’s future security responses. Because transformation is dependent on choices made today, a common, coherent approach and strict oversight to continue the “process” is demanded to ensure the Department and the Services are moving toward a common objective.

⁸ Office of the Secretary of Defense. *Quadrennial Defense Review Report 2001*. September 30, 2001. Page 29.

⁹ The White House. *2002 The National Security Strategy of the United States of America*. Chapter IX. Transform America’s National Security Institutions to Meet the Challenges and Opportunities of the Twenty-First Century. September 2002.

The Office of Force Transformation

In order to keep tabs on transformation efforts, DOD has established the Office of Force Transformation. In the QDR and Defense Planning Guidance, Secretary Rumsfeld called for the establishment of an office to promote, analyze and evaluate defense transformation efforts. This action fulfilled a need identified by the Defense Science Board in noting an insufficiently empowered small J-7 group within the Joint Staff overburdened with the task of oversight and management.¹⁰ On November 26, 2001 DOD appointed the director of the newly formed Office of Force Transformation, Vice Admiral (Ret) Arthur K. Cebrowski. The office's stated role is to monitor, coordinate, and then recommend integration of the transformation activities of the military departments. These recommendations flow directly to the Secretary and Deputy Secretary of Defense. A staff of approximately 20 personnel handles five broad areas: linkages to key elements of strategy, concept formulation, technology issues, joint and Service level experimentation programs, and operational prototyping. Military members head only two of the five sections. The strategy section, tasked with formulating and influencing long-range transformation efforts, is overseen directly by Admiral Cebrowski and is manned with senior civilians.

Congress's Role in Defense Transformation

As part of its role in overseeing U.S. defense activities, Congress may monitor, assess, and modify the Administration's proposals concerning defense transformation. For the past two years, through congressional hearings, testimony, and legislation, defense committees have highlighted the promotion of transformation of the Armed Forces to meet the threat of the 21st century as one of its priorities.¹¹ Indeed, Congress has often played a key role in military innovation and adaptation. A recent example is its inspiration of U.S. military organizational change in the mid-1980s.¹² Scholars highlight several characteristics of past successful military transformations that emphasize roles Congress has played in DOD efforts. Some of the most referenced features include visionary leaders (the catalyst), a pressing national concern (the focus), a long-term commitment, a tolerance for failure, and an environment promoting experimentation and risk-taking.¹³ Most recently, in 2002,

¹⁰ Department of Defense. *Report of the Defense Science Board Task Force on DOD Warfighting Transformation*. Office of the Under Secretary of Defense For Acquisition and Technology. September 1999.

¹¹ Committee on Armed Services, United States Senate. National Defense Authorization Act for Fiscal Year 2003. Report 107-151. US Government Printing Office. May 15, 2002.
Committee on Armed Services, United States Senate. National Defense Authorization Act for Fiscal Year 2002. Report 107-62. US Government Printing Office. September 12, 2001.

¹² The Goldwater-Nichols Department of Defense Reorganization Act of 1986 (P.L. 99-433) is considered landmark legislation as it reorganized DOD into a more unified military structure. The Nunn-Cohen Amendment to the 1987 DOD Authorization Act gave birth to U.S. Special Operations Command. The combination of these measures shaped DOD and transformed joint operations and command structure.

¹³ Randolph P. Miller. *U.S. Military Transformation and Experimentation Historical Perspectives, Prospects, and Prescriptions*. Air University. April 2002.

(continued...)

Congress noted technology transition has been stifled in three areas: leadership, organizational cooperation, and funding.¹⁴ While technology may foster some innovation, leadership will function as the enabler of the current movement.

Congress is in a position to instigate, enable, damper, or impede the transformation effort. Congress can determine the necessity and extent of defense adaptation to emerging security concerns, and it can also ensure clarity of vision and strategy. All of these determinations will have broad impact on requirements and resources necessary for the task. Congress carries out its role across the full spectrum of its Constitutionally mandated responsibilities. Legislation of the defense appropriation and authorization bills are the primary tools to implement, adjust, or focus defense policy. Oversight authority for executive branch activity assures broad national concerns are recognized and transformation is balanced against competing defense priorities, such as near-term readiness and operational requirements. The current term for any Service chief or the Chairman is only two years with a possible extension to four. The Secretary of Defense serves an administration with an initial 4-year life span. This background tends to support a broader long-term commitment being as much a responsibility of Congress as DOD. Failure to take a long view of transformation may not condemn the effort to failure, but it has in the past led to extended timelines, increased costs, and less than optimum results.

Not to be overlooked is the Congressional appointment and re-appointment process. Congress reviews nominations on all leadership from the Secretary of Defense and the Chairman of the Joint Chiefs of Staff, through the individual Service chiefs and assistant secretaries. And, of course, Congress holds the “power of the purse”. The direction, speed, length of the journey, and eventual destination of transformation reside in the continued long-term collaboration between the Executive and Legislative branches of government.

Issues for Congress

Is Transformation Necessary?

Many ask, is “leap ahead” defense transformation necessary for the world’s most powerful military? The military, if left to its own devices, would continue to evolve and adapt to rising challenges. Has the present administration made a sufficient case for the proposed level of transformation? Some argue that militaries transform for one of two reasons. First, changing operational challenges arise to greatly reduce the effectiveness of existing forces. Additionally, militaries transform because they see a developmental opportunity to bring future advantage to their forces. Necessity tends to be a driving motivator in past military transformations as

(...continued)

Department of Defense. *Report of the Defense Science Board Task Force on DOD Warfighting Transformation*. Office of the Under Secretary of Defense For Acquisition and Technology. September 1999.

¹⁴ Committee on Armed Services, United States Senate. National Defense Authorization Act for Fiscal Year 2003. S.Rept. 107-151. Sec. 242. US Government Printing Office. May 15, 2002.

exemplified by operational planning from the Battle of Crecy in 1346 to Berlin in the 1920s.¹⁵ But has the Administration successfully argued for more emphasis in the effort? While the Bush administration entered office disposed to push for internal DOD changes, the events of September 11, 2001 may have underscored that motivation and provided a platform for articulating the perceived urgency of the effort for defense transformation. The conflict in Afghanistan further dramatized the changing character of American security challenges.

The Defense Science Board, as early as 1999, postulated that commercialization and globalization of defense and technological and industrial bases coupled with profound societal changes worldwide could generate unique and ominous challenges for the nation's defense.¹⁶ In 2001, the DOD-sanctioned Transformation Study Group echoed these comments suggesting four reasons to transform defense: (1) Capitalize on relevant strengths. (2) Preserve current strengths. (3) Meet new threats. (4) Exploit new opportunities offered by technology.¹⁷ DOD presented its position in the 2001 QDR. The review outlines the emerging challenges and argues advancements in technology and hardware alone will not secure the nation against asymmetric global threats. Emerging as the military's first priority and most daunting task, a heightened need for homeland security is one of the Administration's arguments for refocusing the armed forces. The QDR reviewed specific characteristics shaping the security environment and the need for transformation.¹⁸

Key Characteristics of Security Environment Requiring Transformation

1. Diminished protection of geographic distance
2. Proliferation of weapons of mass destruction
3. Increasing challenges from weak/failing states
4. Unpredictability of conflict locations
5. Rapidly advancing technologies available to adversaries
6. Competitions developing space and information operations
7. Reduced access to forward bases
8. More operations in urban areas
9. The politics of "limited objectives"
10. Adversaries who generally don't fight to win, but rather fight not to lose

DOD's vision of the security environment is reinforced by military scholars' and theorists' views on Fourth Generation Warfare (4GW). Fourth generation warfare

¹⁵ During the Hundred Years War, the beleaguered and badly outnumbered English turned to peasant longbowman to defeat mounted French knights. This battle reinvented warfare making chivalric battles an outmoded form of warfare. The Germans held to the strict limitations of the Treaty of Versailles after their loss in World War I were forced to consider new tactics and ways to adapt recent technology advances in armor and aircraft.

¹⁶ Department of Defense. *Report of the Defense Science Board Task Force on DOD Warfighting Transformation*. Office of the Under Secretary of Defense For Acquisition and Technology. September 1999.

¹⁷ Transformation Study Group. *Transformation Study Report: Transforming Military Operational Capabilities*. April 27, 2001.

¹⁸ Office of the Secretary of Defense. *Quadrennial Defense Review Report 2001*. September 30, 2001.

refers to a new wave of trans-national groups taking center stage to stymie Western globalization and challenge military forces in battles not to win but to further their cause. 4GW attempts to undermine an opponent's strengths while exploiting their weaknesses. On these battlefields, large, technologically advanced, "heavy" military forces play a supporting role to special operations, intelligence, and law-enforcement personnel. Technology will aid the efforts but not drive the results. 4GW theories contend future wars will not be simple, high tech conventional wars, but rather extremely complex low-intensity conflicts transcending national boundaries and ethnic/religious geographic fault lines. Current conflicts in Iraq and Afghanistan offer glimpses of these unfolding scenarios. Current events dictate the U.S. military must be able to provide great flexibility in options across a broad spectrum, from simple acts of terror to employment of weapons of mass destruction.

Additionally, many argue the opportunity to transform exists now because America possesses a strong military and, beyond continuing regional conflict, the world is at relative peace. The United States has no peer and is not likely to have one for at least another decade. Are there consequences of not transforming? Advocates argue successful militaries seldom take the initiative to study new approaches and often become complacent or conservative until they find themselves bloodied. Militaries must continue to adapt to significant changes in the international security environment.

Critics counter the military has progressed on a steady path of modernization and transformation as evidenced by success in the field from Eastern Europe to Southwest Asia. As the potential cost of failure is very high, a slow methodical evolution toward broad spectrum force is a preferred approach, according to this view. With constrained finite resources, coupled with a variety of near-term demands, sufficient study of all options has not been explored. The questions are: what are the alternatives, what pace does transformation need to take, and to what final end?

Modernization versus Transformation

The recent public highlighting of the transformation concept has provoked many questions. How will DOD transform and still maintain force readiness to answer ongoing security challenges? How does one differentiate transformation from modernization or normal recapitalization? Is DOD going to mortgage current systems and programs to "leap" into new technology? General Richard Myers, CJCS, stated to Congress, "As history has repeatedly shown, Service modernization efforts have often proven to be the key to transformational change." What should be considered prior to committing resources toward a certain approach or evolution? Might the success or failure of a system program ultimately rest on whether it is labeled transformational?

A key tenet of transformation is balancing risk. In order to balance near-term risk, DOD continues to modernize existing equipment to meet current and future requirements and maintain force readiness. The Transformation Study Group recommended committing approximately 80 percent of the transformation effort to maintaining course and momentum of current capabilities that also support the transformational vision. As part of DOD's commitment to modernization it has

chosen to recapitalize select legacy systems in order to meet near term goals with hopes that “current modernization programs will provide the main impetus for transformation in the 21st century”¹⁹. Vice Admiral (Retired) Arthur Cebrowski, Director of the Office of Force Transformation, stated “Any enterprise is interested in modernization as its capital plant ages and must be replaced.....The lion’s share of the defense budget in coming years will still be devoted to operations and modernization. The fraction to be spent on transformation will be very small in comparison. One cannot neglect either modernization or transformation.”²⁰ The conundrum comes in selecting those legacy systems to modernize a time when transformational operational concepts and organizations are still in their infancy.

The last decade’s modernization efforts were held largely in check by an upsurge in military operations to stem the tide of ethnic, religious, territorial, and economic tensions. With the post-Cold War “procurement holiday” taken in the 1990s, military equipment has aged in some categories to unprecedented levels, from Marine combat vehicles and helicopters to Air Force aircraft. The Navy has not purchased enough ships to prevent falling below a 300-ship inventory. This level has, for years, represented the minimum level required for the Chief of Naval Operations to ensure maritime security. To ensure steady state inventories of major weapon systems, even with Service directed life cycle extensions, will require substantial increases in investment through the end of the decade according to the Congressional Budget Office. In FY2004, DOD has requested over \$80B for procurement, a 30% increase over FY02 Future Years Defense Program (FYDP) estimates.²¹ Many, including some on the House Armed Services Committee, believe that this is insufficient and additional dollars for weapon system modernization and to increase inventories of precision-guided munitions will be required.²²

Some analysts have noted that DOD has taken a slow, steady approach to transformation. While some smaller programs have been cancelled, many larger modernization efforts have continued under close scrutiny and limited timetables. Additionally, some believe Service modernization programs have been reborn with transformation labels.²³ Examinations of individual defense programs and senior DOD official congressional testimony have noted between budget years a migration of hardware from modernization to transformation accounts. Sometimes, this hardware has moved back to the legacy framework once continued program support is acquired. It is not within the scope of this report to examine this phenomenon, but it has raised the ire of some within competing Service branches and some senior officials.

¹⁹ General Richard Myers. *CJCS Annual Report to Congress*. February 2002.

²⁰ Vice Admiral (ret) Arthur K. Cebrowski, Director, Office of Force Transformation. An Interview with the Director. Office of the Secretary of Defense.

²¹ Rear Admiral Stanley R. Szemborski, USN, Deputy Director for Resources and Requirements. *Transforming the Defense Establishment*. CRS Brief. February 6, 2003.

²² Kerry Gildea. Hunter Says HASC Will Focus On Beefing Up Modernization, PGM Accounts. *Defense Daily*. January 10, 2003.

²³ Steven Kosiak. FY2004 Defense Budget Request: Back to Cold War-Level Spending, and Beyond. Center for Strategic and Budgetary Assessments. 31 January 31, 2003.

The nature of this shift, or transformational categorization, may be due to potential or realized technological or conceptual breakthroughs, but that is not clear. For example, the Army's Comanche Helicopter and Patriot Anti-Tactical Ballistic Missile upgrade have been identified by the Administration for transformational funding.²⁴ Both programs have been in existence for a decade and had previously been associated with force modernization. Similarly, Air Force C-17s and F-22s and modified Navy Trident-class submarines join transformational ranks as they replace their aging counterparts. From the crowd of DOD programs certain funded legacy systems stand out. Army CH-47 modernization, Navy F/A-18 Super Hornets, and the Air Force Evolved Expendable Launch Vehicle (EELV) all represent examples of legacy systems being modified to leverage future transformation. This leverage is exemplified in the EELV, an affordable family of launch vehicles provided by two large defense contractors, built to assure DOD access to space for its multiple command, control, communications, computers, intelligence, surveillance, and reconnaissance (C4ISR) platforms.

Critics argue modernization procurement costs are growing because the money goes to next-generation systems rather than current existing systems.²⁵ They argue current systems like the latest Block of F-16 fighter is five times as capable as its predecessor. Additionally, the same F-16 would cost \$30 million as compared to an estimated \$65 million for the Joint Strike Fighter. While they agree procurement should include next generation equipment, they argue numbers could be scaled back without hurting long-term capability, if off-set with current generation buys. They also contend current skyrocketing operations costs are tied less to aging equipment than to other factors. Using five Air Force legacy systems, the B-52, the KC-135, the F-15, the C-130, and the E-3, all having exceeded planned life expectancy, their study indicates an impact on Air Force operations and maintenance accounts of less than 2% for FY2001. While these aircraft are only a portion of the overall fleet, they represent almost 1500 airframes and all of the Air Force's oldest models. They agree this is a long term concern but argue that it is not of the magnitude currently reported. Critics contend current modernization funding is more than sufficient and transformation should focus more on less-costly upgrading/modifying current and existing platforms.

Alternative Approaches to Transformation

Once transformation is determined necessary, further determinations are required as to how best to spend the allocated funds. In FY03, DOD requested nearly \$128B for current and future weapons and capability. Advanced technology is costly and with operations and maintenance costs also spiraling, the time comes when a prudent choice toward future investment is at hand. Two senior analysts have presented options for recapitalizing military hardware. A Brookings Institution senior fellow based alternatives on military technological investment concepts.

²⁴ Committee on Armed Services United States Senate. *DOD Policies and Programs to Transform the Armed Forces to Meet the Challenges of the 21st Century*. U.S. Government Printing Office.

²⁵ Steven M. Kosiak. Three Myths About DOD Weapons Modernization Requirements. CSBA Online. June 18, 2001.

Alternatively, a senior analyst from the Center of Strategic and Budgetary Assessments (CSBA) approaches the issue from a budgetary mindset. They represent only two of many diverse and interwoven options for meeting tomorrow's security challenges.

Michael O'Hanlon, senior fellow at the Brookings Institution, presents four schools of thought related to investment in military technology.²⁶ The first school is referred to as the "system of systems". This approach postulates future wars will be dominated by real-time data processing and highly networked forces rather than individual platforms or weapons. It merges increasing capacity to gather real-time, all-weather information with continuously increasing capacity to process and make sense of large amounts of data. When married with precision force, this "system of systems" approach "posits a qualitatively different military potential."²⁷ The combat focus would be on smart munitions and the networking of combat systems rather than expensive new delivery vehicles. Israel offers an example of an extremely capable military created and sustained by relatively modest defense budgets.

The second school of thought is described as the "dominant battlespace knowledge" school. This approach builds on the "system of systems" approach with active and passive sensors. The concept is to produce a tactically transparent battlefield where U.S. forces can quickly find, fix, and engage adversaries in all types of environments. This approach is more ambitious and pre-supposes breakthroughs in technology ranging from C4 to intelligence, surveillance, and reconnaissance (ISR), completing the revolution in military affairs (RMA). While more expensive than the less complex "system of systems" approach, even with recent technological gains, critics question the "dominant battlespace knowledge" concept's feasibility due to current ISR limitations.

The third school outlined is "global reach, global strike." This approach advocates agile and precise new weaponry, based on U.S. soil and able to deploy and then employ firepower decisively within days anywhere in the world. It incorporates both of the first two schools and adds new platforms to further advance warfighting capability. By far the most expensive, it emphasizes force restructuring that favors the Air Force. While drawing critics from the other Services, this approach does argue for ground forces albeit radically reorganized from today's structure. This approach emphasizes a smaller, lighter force organized around "enhanced combat cells" of 10 — 20 personnel. The major drawbacks are the expense and reliance on advanced, in some cases unproven, technology.

A final approach to transformation is aptly named the "vulnerability" school as it focuses on what an adversary might inflict on America. With homeland defense and force protection as its centerpiece, this defensively focused approach looks to missile defense systems and biological and chemical sensors to provide strategic warning rather than offensive technologies. The growing proliferation of military technology threatens U.S. capability to safely function from many overseas forward

²⁶ Michael O'Hanlon. *Technological Change and the Future of Warfare*. Pages 10-16.

²⁷ Admiral William A. Owens, USN. *Dominant Battlespace Knowledge*. National Defense University. April 1996.

operating locations. To overcome these challenges, O'Hanlon promotes investment in pre-positioning of supplies and strategic lift, vulnerabilities highlighted in Desert Storm. While defensively oriented, this approach is not significantly less expensive due to the mounting cost of an effective, still in experimentation, missile defense.

Another analyst, Steven M. Kosiak of CSBA, approaches this issue from a funding aspect with four options.²⁸ His first option, suggests fully funding QDR modernization goals, which in turn would rapidly enhance the performance of U.S. military hardware. Proponents of this option assert that future requirements are clear and new advanced hardware best meets the current and future military need to manage potential challenges. They believe dramatic advances in capabilities and long-term serial production would improve efficiency while reducing overall costs. Expressed concerns with this approach are the unproven nature of the technologically advanced hardware and the high cost. Since it is unclear what hardware is required by "new operational concepts", large scale purchases might threaten other less cutting edge programs that may prove valuable in future conflict.

A second option involves a greater reliance on production of current generation weapon systems with a smaller scale procurement of next-generation hardware. Included in this plan are upgrades of existing or legacy systems to extend their service life. Advocates point to the substantial cost savings, conceptually as much as \$15B, and the technologically proven nature of the hardware reduces fiscal risk. This approach is in line with other nations' defense recapitalization plans and provides for a continued strong military. Previous small scale purchases of military hardware have proven extremely valuable to DOD.²⁹ Opponents argue this would continue to minimize the potential gain from a surge in information operations technology. Not acting now might allow adversaries to procure equivalent technology and reduce the nation's combat edge. Small scale procurement might limit commanders options for employment and could further exacerbate the issue of low-density/high-demand assets. Modification/upgrade of existing systems extends the life span of equipment already reaching historically high age levels. Much debate has occurred on both sides of this approach.

Kosiak's third option would attempt to eliminate force structure to offset transformation costs. Proponents of this option argue the vast improvement in capability allows for an appreciable reduction in force structure without impacting national security. History supports this approach as the U.S. has consistently chosen quality over quantity and has generally adopted more modern, yet smaller, forces over the past fifty years. Such reductions could yield potential long-term budgetary savings but the savings have usually been absorbed in other areas. Critics state the increased short-term risk fueled by force cuts is not worth the perceived benefit. They insist the increase in scope and duration of recent operations would advocate

²⁸ Steven M. Kosiak. *Buying Tomorrow's Military: Options for Modernizing US Defense Capital Stock*. Center for Strategic and Budgetary Assessment. Washington, D.C. 2001. Pp. 31-44.

²⁹ The F-117 stealth fighter as does the B-2 bomber. The F-117 production numbered only 51 aircraft. The B-2 stealth bomber was originally planned as a replacement for the B-52 with a procurement of approximately 242 aircraft. Final production was halted at 21 planes.

force structure increase not decrease. Additionally, it is thought with future mission evolution unclear, an ill-defined force structure decrease based on technological advancement not on operational concept development is folly.

The final approach focuses entirely on transformation. This option would focus expenditures on “wildcatting” or experimenting with limited numbers of a wide variety of military hardware, as well as operational concepts and force structures. The end result would identify in a decade what equipment is worthy of large scale production. Proponents state this allows DOD to cover all bases without overly committing to a single approach or program. History also supports this approach and it keeps the defense budget from substantial increases. Critics recognize the effort but admit this does little to meet today’s readiness requirements. They also state that by postponing large scale development it threatens huge defense budgets in the future and starves the entire military industrial complex now.

In the end, most senior analysts believe a combination of approaches might actually hold the solution. The Bush administration and DOD appear to have combined several of the above approaches, while covering risk with the purchase of current generation systems and maintaining force structure. In taking this aggressive approach, the major impediment revolves around the sheer cost, in defense dollars and security focus, of such an all-inclusive concept. Critics would argue that a high cost transformation approach is counterproductive to long-term security interests as it reduces funding for other security issues such as global engagement. They base this argument on estimated near-term acquisition and research and development costs of approximately \$100B. These costs alone are almost twice what the world’s second largest military, Russia, spends on its entire military establishment.³⁰ They insist a focus on a more modest approach would capitalize on proven technological advancements while allowing the Services to focus on other major challenges like joint interoperability and their inherent vulnerabilities associated with force protection and system operations assurance.

The Cost of Transformation

Congress, as federal appropriator, has a particular interest in the answer to this question: What does DOD think it has to spend to transform? Over the past fifteen years, DOD has spent just under one third of its total funding on procurement and research, development, test, and evaluation (RDT&E).³¹ With the large increase in DOD budgets, this spending has increased in proportion about one and one half percent. Is this enough or too much? It is important to note at the outset that DOD alone designates programs as transformational and decides when to remove systems from this category. DOD-labeled transformational programs account for 17% (about \$21 billion) of all procurement and RDT&E investment in 2003, rising to 22% by 2007. Is this spending effective? Pentagon Comptroller Dov Zakheim places the set aside for military transformation over the next six years at about \$240 billion. These

³⁰ Center For Defense Information. *2001 — 2002 Military Almanac*. Washington, D.C. Page 39.

³¹ Executive Office of the President. *Historical Tables: Budget of the United States Government*. Fiscal Year 2003.

requested monies are placed in several different categories to attempt to achieve in some measure the six broad transformation goals set down by Secretary Rumsfeld. According to the Secretary, the transformation program costs are as follows:³²

(1) To help defend the homeland and bases overseas — \$7.9 billion in FY2004 and \$55 billion over the FYDP.

(2) To project and sustain forces in distant theaters — \$8 billion in FY2004 and \$96 billion over the FYDP.

(3) To deny enemies sanctuary — \$5.2 billion in FY2004 and \$49 billion over the FYDP.

(4) To enhance space capabilities — \$300 million in FY2004 and \$5 billion over the FYDP.

(5) To harness U.S. advantages in information technology — \$2.7 billion in FY2004 and \$28 billion over the FYDP

(6) To protect information networks and attack those of our adversaries — \$200 million in FY2004 and \$6 billion over the FYDP.

The total request in FY2004 is \$24.3 billion to transform military capabilities. According to some analysts, that figure may only be the tip of the iceberg. The Congressional Budget Office (CBO), without benefit of FY2004-2009 defense budget numbers, completed a study in January 2003, indicating demands for defense resources will increase over the long term. CBO's rationale centers on three historic upward trends: transition from development to production or increasing production for a number of existing programs; continued growth in the costs to operate and sustain future forces; and continued development and production of transformational systems.³³ All of these trends indicate a rise in cost risk for military transformation.

Table 1. DOD Military Budget Authority

(Funding in \$ billions)

	FY1990	FY1995	FY2000	FY2003 est
Military Budget Authority	293	256	290	364
Personnel	79	72	74	93
O & M	88	94	109	130
Procurement	81	44	55	71
RDT&E	36	35	39	57

Source: Budget of the United States Government, FY2004. Historical Tables. Table 5.1, Line 051.

³² Donald H. Rumsfeld. FY2004 Defense Budget Testimony. House Armed Services Committee. February 5, 2003.

³³ Congressional Budget Office. The Long-Term Implications of Current Defense Plans. The Congress of the United States. January 2003.

Table 2 illustrates transformational investment based on DOD categorical designation. It sets specific hardware and programs against DOD's transformational goals over fiscal years 2002, 2003, 2004, and the FYDP. Transformational categorization did not exist in FY2002 and the numbers expressed are meant as a reference point for FY2003 and FY2004 cost analysis. Programs have been rounded to the nearest tenth of a billion dollars. Programs with nothing indicated next to them have received funds but not to the threshold amount. Those programs receiving no support are marked zero. To better analyze current year spending, FY2002 figures on major programs, still discerned to be transformational, have been annotated where applicable. It becomes apparent in this table that as spending has increased in total procurement and RDT&E so has transformational funding. Additionally, the percentage of funding for transformation has increased almost linearly with the outlay. Another important point to remember is statistically the numbers can easily be shifted toward transformation or modernization by merely re-labeling a program.

Table 2. Transformational Investment
(Funding in \$ billions)

Transformational Goal	DOD System	FY02	FY03	FY2004	FY04-FY09
Protect Bases of Operation			7.7	8	55
	Missile Defense	7	7.7	8	51
	Airborne Laser		0	0	2
	SBIRS Low			0	
	M-THEL				1
	JLENS				
Project and Sustain Forces			7.4	8	96
	MC2A/Tanker Replacement		0.2		7
	New Bomber				1
	LAIRCM		0.1		1
	GPS	0.4	0.8		4
	V-22	1	1.6	2	14
	Interim Armored Vehicle	0.7	0.9		
	Future Combat System		0.2	2	23
	Army Experiments and Demos		0.2		
	Army S&T		0.6		
	High Speed Sealift				1
	New Helicopter/Comanche	0.8	1		
	Advanced Deployable System				1
	AAAV		0.3		
	UUVs				1
	LCS				4
	MPF-F				4
	E-2 RMP	0.3	0.2		3
	STOVL JSF		1	1	13
	Organic Mine Warfare		0.1		2
	CVN-21	0.5		2	15
	Sea Basing				1
	New Ship Design			0	
	Undersea Operations			0	1
Deny Sanctuary to Adversaries			3.2	5	49
	UCAV			1	4
	SDB				1
	High Speed Missile			0	
	ISR Platforms/UAVs		0.8	1	10
	JSTARS	0.5	0.4		1
	F/A-22 Ground Attack				2
	Space Based Radar		0.1		6
	National Aerospace Initiative				2
	ATACMS	0.2	0.3		
	Guided MLRS	0.1	0.1		2
	Long Range Adv Scout Surv				
	Excalibur		0.1		1
	TACMS-P				
	SSGN	2.8	1	1	2
	DD (X)		0.3	1	17
	Alternative Weapons Design		0.1	0	

Transformational Goal	DOD System	FY02	FY03	FY2004	FY04-FY09
	Biomechanic R&D			0	
Leverage Information Technology			2.5	3	28
	Tactical Data Links		0.3		3
	Transformational Comms System	0.5	1.3	1	11
	Joint Tactical Radio System	0.1	0.1	1	5
	Network Centric Info Warfare		0.1		
	WIN-T		0.1		1
	Soldier Mod/Land Warrior		0.1		1
	Cooperative Engagement Capability	0.1	0.2		
	Naval Fires Network				
	Deployable Joint C2		0.1		
	MUOS		0.1		4
	Common Aviation C2 System		0.1		
	Unit Operation Center				1
	Gig Bandwidth Expansion				
	Network Centric Enterprise Services				
Conduct Effective Information Operations			0.2	0	6
	Aerospace Operations Center		0.1		1
	Automated ISR		0.1		2
	DSRP			0	2
	Next Generation Intel, ISR			0	1
	Computer Network Capabilities			0	
Enhance Space Operations			0.2	0.3	5
	CAV				5
	Space Control Systems		0.1		
	Directed Energy Technology		0.1		2
	Optical Deep Space Imaging			0	1
	New Material Development			0	
	Advanced Space Access			0	1
	Space Defense Systems			0	1
Transformation Total Funding		15	21.1	24.3	239
Procurement and RDT&E Total Funding		110.8	127.4	134.5	
Percentage of Funding For Transformation		13.5	16.5	18	

Multiple Sources: FY2002, FY2003, FY2004-2009 DOD Budget Documents and Testimony.

Off-setting the Cost of Transformation

Covering the high cost of military transformation while attempting to meet worldwide obligations and security concerns will challenge DOD for the next several years. Can we afford to transform? If we must transform, are there ways to off-set some of the implied costs? To help fund the effort, DOD had the Services reexamine existing and future programs in an attempt to balance both risk and the books. In addition, other DOD initiatives could provide long term cost savings and assist in funding the procurement of weapon systems. Three major thrusts already underway are the push to reform DOD acquisition processes, DOD privatization and outsourcing, and the planned 2005 Base Realignment and Closure Commission.

The Services reallocation efforts could produce almost a third of the funds projected for transformation, upwards of \$80 billion. The Army plans to kill or terminate 24 systems and reduce or restructure another 24. It has begun to retire older aircraft and has focused modernization on only those legacy systems with the potential to aid transformation. Army savings could reach \$22 billion. The Navy records the highest potential savings with \$39 billion. It retired 26 ships early with plans to retire another 13 ships in this fiscal year. Additionally, Navy officials state, the Navy will retire 259 aircraft and have plans to reduce manpower end strength by 10,000 by the end of the FYDP. They will also focus modernization dollars on highest priorities. The Air Force says it will retire 114 fighter and 115 mobility/tanker aircraft. With their funding priorities being readiness and people programs, the Air Force could save up to \$21 billion.³⁴

Defense acquisition processes have long been blamed as the cause of spiraling defense costs. Congress and the executive branch have worked over the past several years to reform the process. However, Secretary Rumsfeld recently commented that despite 128 acquisition reform studies, DOD has a system in place that since 1975 has doubled the time it takes to field a new weapons system.³⁵ The acquisition process has remained little changed over the last fifty years. Starting in the 1990s, with former Secretary of Defense Perry and congressional backing, incremental changes to reform defense policies and processes began to produce change although with minimal cost savings. The general decline in procurement throughout the decade shifted emphasis from new acquisition to upgrading of existing systems and research and development of new weapons. DOD has moved to reduce regulatory barriers and encourage integration of commercial "off-the-shelf" technology. Developing better ways to identify, validate, and acquire new systems is essential to transformation. Experts argue now is the time, with an upturn in procurement, to move with lasting reform. It is also believed, DOD can realize substantial savings if effective reform is authorized and implemented. This savings could then be reinvested in both modernization and transformation. DOD holds up its Air Force and Navy JDAM program as an example of the types of cost savings available through accelerated acquisition processes. With an integrated product team approach and commercial components, the program shaved 67% off per unit costs, saving an

³⁴ Admiral Szemborski. Brief to CRS on FYDP Defense Budget. February 6, 2003.

³⁵ Secretary of Defense Donald H. Rumsfeld. Pentagon Town Hall Meeting with Secretary Rumsfeld. United States Department of Defense. March 6, 2003.

estimated \$2.9B billion in program costs. Under Secretary of Defense for Acquisition, Technology, and Logistics Edward "Pete" Aldridge announced DOD's five goals for acquisition reform as:³⁶

- (1) Improve the credibility and effectiveness of the acquisition and logistics support process
- (2) Improve the morale and quality of the acquisition workforce
- (3) Improve the health of the defense industrial base
- (4) Rationalize weapon systems and infrastructure with new DOD strategy
- (5) Enhance those high leverage technologies for the future

As the reform process proceeds, continued vigilance of ongoing programs could also prevent historic cost overruns and extended time-lines. Last year Under Secretary Aldridge certified six major defense programs under the requirements of the Nunn-McCurdy Law. Nunn-McCurdy requires DOD to certify all programs with 25% cost increase as necessary for national security. Additionally, it demands placing cost controls on the programs to get them back on budget. Secretary Aldridge states he uses four criteria for this type of certification: Is the program essential for national security? Is there an equally capable, lower-cost alternative? Are costs under control? Is management in place to keep spending under control?³⁷

Past Congresses have encouraged defense reform in the areas of privatization and outsourcing, although this topic remains controversial. Simply defined, privatization is the movement of functions from within DOD to the private sector. The expected return for this effort is to streamline operational capability and produce long term cost savings. Both DOD and past Congresses have pushed for greater competitive outsourcing of functions addressed under OMB Circular A-76 and the FAIR Act for cases in which private industry may prove more efficient at certain specialized functions while able to produce an equal or better quality product. In the past, DOD privatization has focused on mundane functions such as food service, housing, and grounds maintenance and security. More recently, major weapon system training, maintenance, staff administration, and communications/information systems support have been added to the list.³⁸ DOD has considered privatizing as many as 226,000 civilian and military jobs by 2008. About 50,000 of this number represent military personnel while most are DOD civilians. A short-term Administration goal would compete about 15% of its "commercial" jobs by the end of September, 2003. The department reportedly considers about 241,000 of the 680,000 civilian positions commercial. Studies performed by the department between 1995-2000 indicated an average 34% savings on previously competed work.

³⁶ Under Secretaries of Defense. Town Hall Meeting with the Under Secretaries of Defense. United States Department of Defense. December 18, 2002.

³⁷ Jim Garamone. DOD Certifies Six Acquisition Programs. American Forces Press Service. May 2, 2002.

³⁸ Kenneth Bredemeier. Support U.S. Forces In Persian Gulf — Thousands of Private Contractors Support U.S. Forces in Persian Gulf. *Washington Post*. March 3, 2003.

DOD estimates savings as high as \$11.7 billion by 2005.³⁹ During the first Gulf War contractor to soldier ratios were approximately 1 to 100. This time around the estimate reportedly may be as low as 1 to 10.⁴⁰ The long-term effect of this move has not been studied and neither has the operational ramifications in terms of contractor deployability, forward area force protection issues, and other pertinent issues. Critics question whether the government is able to conduct competitions in a fair and honest manner, as well as have the metrics in place to capture whatever “savings” there may be. Before critical functions begin to migrate sufficient study into alternative methods and the long term impact of this migration need to be explored. Critics also suggest outsourcing is not always to the government’s advantage and may actually, in some instances, compromise national security. They challenge DOD’s cost savings projections and recommend other less dramatic approaches to achieve greater efficiencies. Opponents assert restructuring, re-engineering, consolidation, and the adoption of a streamlined business model may increase productivity and lower costs with few negative operational side-effects such as union work stoppages or compromised safety.⁴¹

DOD base closure represents another method to cut existing overhead costs and fund other programs. Since the last round in 1995, every Secretary of Defense has asked Congress to authorize additional base closures. In late 2001, Congress signed into law legislation to conduct one new closure round in 2005. During the previous four Base Realignment and Closure (BRAC) commissions 451 installations were earmarked for closure or realignment. Included in the lists were 97 major military installations. With all activity completed DOD estimates a \$14B net savings, with recurring annual savings of about \$5.7B. DOD believes they still maintain excess military infrastructure of between 20 and 25%.⁴² All previous commissions only reduced infrastructure 21%. Future savings from yet to be identified closures are near impossible to predict and would not start to positively impact the defense budget until near the end of the decade. This said, the Congressional Budget Office estimates DOD could realize operation and support net cost savings in the neighborhood of an additional \$5B per year by 2014.⁴³

Evaluating Transformation

Can transformation be measured? And if so, how? To evaluate progress on the path called transformation two elements are required: a transformation strategy and a metric to gauge progress toward its fulfillment. Additionally, one must determine if this proposed transformation is concept or technology driven. This is important in

³⁹ David Phinney. DOD May Private Jobs, Retire Equipment in Push to Cut Costs. *Federal Times*. January 27, 2003.

⁴⁰ Nelson D. Schwartz. The Pentagon’s Private Army. *Fortune*. March 17, 2003. Pg. 100.

⁴¹ For more information on the outsourcing see CRS Report RL30392. *Defense Outsourcing: The OMB Circular A-76 Policy*, by Valerie Grasso.

⁴² Office of the Secretary of Defense. *Quadrennial Defense Review Report 2001*. September 30, 2001.

⁴³ Congressional Budget Office. *The Long-Term Implications of Current Defense Plans*. The Congress of the United States. January 2003.

determining milestones. Programmatic milestones are somewhat easier to measure and built into the research, development and acquisition processes. Concept-driven reform is much more difficult to assess. While experimentation might lend credence to new strategy, the battlefield is the only true litmus test. The current, and past, administrations outlined their evolving plans for defense transformation and the Chairmans of the Joint Chiefs put forth their visions in Joint Vision 2010 and 2020. Ultimate goals are indicated in the 2001 QDR. These goals, as directed by DOD's Defense Planning Guidance, also form the foundation for the Services transformation roadmaps. Some experts believe these goals to represent the measure by which DOD and Congress evaluates progress toward transformation of its military forces.

The key agencies for DOD with responsibilities associated with evaluating transformation are the Office of Force Transformation, as an executive agent for the Secretary, and Joint Forces Command, appointed as the military's "transformation laboratory." Specifically, the Office of Force Transformation will act as an independent advisor analyzing transformation program experimentation activities and associated metrics. Joint Forces Command lists as its four mission essential tasks discovery of (concept) alternatives, defining warfighting enhancements, developing joint warfighting capabilities, and delivery of capabilities to warfighting commanders.⁴⁴ A need exists for a metric to evaluate a concept-driven transformation model through advances in key technologies and operational concepts across the full spectrum of military engagement. A certain amount of capability already exists and appreciable advances toward transformation are in various stages of development. The vehicles for expression of this capability and current progress are the Services annual reports and their transformation roadmaps. How DOD frames their evaluation or progress depends a great deal on how the Services structure their forces to produce the effects-based operations associated with DOD's transformational goals. Once the Services lay down forces alongside the proposed goals, gaps and/or shortfalls in capability can be identified and milestones established. These milestones may be achieved through transformation of hardware, organization, or operational concept. The challenge for DOD's agents will be to balance Service efforts toward their inherent strengths while ensuring the equally challenging aspect of joint interoperability.

One useful tool toward gauging enhanced military capability is the monitoring of large-scale joint experiments. These experiments, like the 2002 Millennium Challenge, combine all aspects in the transformation toolbox. They test new equipment alongside legacy systems and employ cutting-edge tactics with joint combat forces. These exercises highlight not only successes but emphasize additional areas for research or experimentation. Integral to these efforts is an unbiased "red team" to expand the joint force's transformational envelope. International adversaries will attempt to employ every asymmetric advantage and the Services will need to show flexibility at each stage of the process.

In the past two years, the General Accounting Office (GAO) has assessed the efforts of two of the three Services and joint efforts in the realm of DOD

⁴⁴ United States Joint Forces Command. USJFCOM Webpage — About Us. [<http://www.jfcom.mil/about/about1.htm>].

experimentation in response to House and Senate Armed Services Committees inquiries.⁴⁵ Think tanks and senior analysts have also provided insight into the administration's progress and emphasize branches and sequels to current trends.⁴⁶ Additionally, CRS analysts have examined a number of individual defense programs.⁴⁷

Upon evaluating transformation, what incentives, good or bad, should apply to organizations and the Services as they progress toward a transformed force? Historically, DOD has rewarded success and penalized failure. This approach may have served well in other aspects, but in terms of transformation it could limit risk taking. Would this disenfranchise the creative individuals required for "leap ahead" results/technology? At the same time, it has been suggested that cost savings, more efficient operations, technological break-through and the like should be encouraged through some type of recognition.

Potential Pitfalls of Transformation

Senior leaders inside and outside DOD, and inside and outside government, have postulated military transformation started with the end of the first Gulf War. When the Joint Chiefs came before Congress in 2000 and presented a clear picture of their concerns for force readiness, retention, and recruiting, the Services were at a crossroad. The lack of procurement spending during the 1990s had diluted the gains of the 1980s. Additionally, high operational tempo (optempo) combined with a reduced force had further diminished the military's competitive edge.⁴⁸ The 107th Congress facilitated both transformation and modernization through oversight, directive legislation, and additional funding. The DOD FY2003 Budget approached \$400 billion and the FY2004 budget will top last year's mark. With this kind of investment, Congress should expect to see some significant modernization and movement toward transforming the force. Past discussions of transformation have been constrained by various national security crises that diverted DOD attention and

⁴⁵ United States General Accounting Office. *Military Transformation: Army Has a Comprehensive Plan for Managing Its Transformation but Faces Major Challenges*. November 2001.

United States General Accounting Office. *Military Transformation: Navy Efforts Should Be More Integrated and Focused*. August 2001.

United States General Accounting Office. *Military Transformation: Actions Needed to Better Manage DOD's Joint Experimentation Program*. August 2002.

⁴⁶ Andrew F. Krepinevich, Jr. *The Military-Technical Revolution: A Preliminary Assessment*. Center for Strategic and Budgetary Assessments. 2002.

Transformation Study Group. *Transformation Study Report: Transforming Military Operational Capabilities*. April 27, 2001.

⁴⁷ CRS Report RL30639. *Electronic Warfare: EA-6B Aircraft Modernization and Related Issues for Congress*, by Christopher Bolkcom.

CRS Report RS20535. *Navy Ship Procurement Rate and the Planned Size of the Navy: Background and Issues for Congress*, by Ronald O'Rourke.

⁴⁸ Operational tempo is defined as the rate of unit activity. The most significant negative impact of high operational tempo is a reduction in time and resources necessary to conduct mission essential training, the basis of force readiness and long-term unit effectiveness.

resources. Operations and support have “borrowed” monies from procurement and research and development accounts to cover checks written for contingencies. Some transformation advocates state this needs to end and a process put into place to fund contingency support and process required supplemental funding in a streamlined fashion. This may prevent the earmarked transformation, procurement, and research and development funds from migrating back to pay today’s bills. Many believe that DOD has made a concerted effort to move forward with defense transformation and Congress has provided them the guidance and resources to meet that end. Past experience with operations in the early 1980s, specifically those in Iran and Lebanon, illustrates results of failing to keep the military attuned to shifting U.S. and global security challenges.⁴⁹

A common misconception about transformation is that everything labeled as “transformational” is inherently good. The corollary is, of course, all programs not associated with transformation must be bad or unnecessary. These misconceptions have led many to think it is necessary to move manpower and resources away from certain areas, Services, and programs. Within the Defense Department the following criteria are used for determining whether a system or concept is transformational: Is it interoperable? Will it enable new concepts of operations or warfighting techniques? Will it deal with a wide range of threats?⁵⁰ The military will have a use for many types of “legacy” equipment for the next several decades. The true utility of the items and their programs to the warfighter needs to be assessed rather than discounting systems due to any categorical designation.

Another potential pitfall is to misjudge risk or over-commit defense assets to transformation efforts. Many argue the world Americans live in today is a more dangerous place than it was 20 years ago. The events of 9-11 support this argument. A significantly reduced national security structure or disengagement from the global stage to resource “leap ahead” technology and still unproven operational concepts may not be prudent. Balance is key and military readiness, optempo, and personnel tempo are all indicators toward assuring the correct balance.⁵¹ Past arguments for different security strategies and transformation approaches may enlighten or provide alternatives. By attempting to continue world-wide engagement while undertaking extensive transformation efforts, this administration has selected what many would consider the most ambitious of the national security alternatives. It also appears committed to the broadest approach to transformation. Both the administration strategy and approach require large amounts of force structure, capital, and

⁴⁹ In April 1980, U.S. forces attempted rescue of embassy hostages held in Iran. The failed operation, named Desert One, left eight dead, five wounded, aircraft smoldering in the Iranian desert, and strengthen Iran’s resolve. On a peacekeeping mission in Lebanon, as part of an international task force, a suicide bomber killed over two hundred Marines, leading to the extraction of U.S. military support.

⁵⁰ Gail Kaufman and Amy Svitak. Pentagon Develops New Transformation Criteria. *Defense News*. March 11-17, 2002.

⁵¹ Personnel tempo, or perstempo, is defined as the sum of all individual absences or activities. Perstempo, like optempo, can impact mission effectiveness and force readiness. In addition, high perstempo tends to directly impacts retention, recruiting, and military family quality of life issues. For more information see CRS Report 98-41, by Michael Ryan.

investment. Future spending priorities and deficit growth, along with the will of the American public, may play important roles in shaping future security commitments. In both feast and famine, it is imperative DOD maintain a balanced approach toward risk management.

Assuring the correct balance of near-term and long-term risk also avoids a third potential pitfall of transformation. What happens if DOD chooses the wrong path to transformation? The French took lessons learned from World War I and constructed a national security strategy, operational concepts, and the Maginot Line to combat future risk. World War II proved the Germans transformational strategy and investment had indeed led to a revolution in military affairs while the French interpretation of lessons learned fell short of the mark. The U.S. has also had problems in the last fifty years capturing the essence of transformation. After World War II through the 1950s and 1960s, much of our national security strategy centered on the new technology of nuclear weapons. This single strategic focus left the US ill-prepared for conventional conflicts in Korea and Vietnam. History reminds that too much investment in a single operational concept can shortchange the full spectrum capability required for a modern military force.

An important pitfall to avoid is the belief that technology alone will bring about transformation. The tank and the aircraft were great advances in defense technology. Precision munitions entered the inventory in Vietnam. None of this equipment initially had great impact on the battlefield or was recognized for its full potential. It took leaders like Guderian and Mitchell to espouse employment strategies, officers from the German General Staff and the Army Air Corps Tactical School to shape operational concepts, and years of war games and strategy sessions to perfect the incorporation of this technology into successful battle plans.⁵² As much effort needs to be expended on operational concept development and experimentation as currently goes into programming new hardware. DOD has positioned Joint Forces Command to pursue these goals. Transformation advocates contend that special efforts need to be made to encourage service acceptance of Joint Forces Command's recommendations.

Finally, DOD seeks to streamline processes and push transformation beyond military forces to business practices, civilian personnel management, and spending flexibility. To achieve the freedom and flexibility it seeks would require legislation and some major policy changes between the legislative and executive branch. Secretary Rumsfeld recently revealed many of the "obstacles" faced by DOD.⁵³ This list included an inability to move \$15 million between DOD accounts, even though the department spends \$42 million an hour, a defense authorization bill that has grown from one page in 1962 to 534 pages in 2001, and congressional requirements, dictating some 26, 000 pages and the preparation and submission of over 800 annual

⁵² Heinz Guderian was the leading theorist of armored warfare in Germany before and during World War II and is credited with developing the famous *blitzkrieg* combine arms tactic. Billy Mitchell was the outspoken proponent of airpower in the 1920s and is thought by many as the father of American strategic bombing theory.

⁵³ Secretary of Defense Donald H. Rumsfeld. Pentagon Town Hall Meeting with Secretary Rumsfeld. United States Department of Defense. March 6, 2003.

reports. Additionally, his proposals listed greater privatization and a more flexible national security personnel system as possible fixes. With freedom to reduce reporting, develop manpower policy, and shift larger sums of money within its budget, come some implications that could raise concerns in Congress. All of these actions, potentially reduce Congressional oversight. With less oversight comes less control over the direction of executive branch vision for national security policy. In the past, Congress has played an active role in shaping defense policy and moving DOD and the Services toward transformation. For example, the National Security Act of 1948 and the Department of Defense Reorganization Act of 1986 were not well received by the military Services at the time but proved extremely valuable to our national defense.⁵⁴

Balancing Transformation with Other Emerging Priorities

The current flurry of activity associated with transformation raises several questions. One of them is the role of the increasingly challenged Guard and Reserves in a transformed military. The 2001 QDR stated, "Protecting the American homeland from attack is the foremost responsibility of the US Armed Forces and a primary mission for the Reserve Components."⁵⁵ Since a post-Vietnam restructure consciously forcing more mobilization call-ups, rather than nationwide draft calls, in response to security crises, little has been done to reapportion military tasks to lighten their load or refine it. Will a shift in missions impact Guard and Reserve force perception as a full partner in national defense? Could this type of shift spill over to public support for its military, the impetus of the post-Vietnam restructure? Guard and Reserve military hardware has often lagged behind the active force. Will their budgets and training be able to keep pace with the demands of a transformed force?

Questions continue in the realm of homeland security. DOD stood up U.S. Northern Command to act as the conduit between their department and that of the Department of Homeland Security (DHS). DHS is in its infancy and may require more funding, personnel, and training for the departments to function as a cohesive team. If Reserve and Guard troops are structured to shoulder more of the homeland security tasks, what will be the fallout? Many of our military's civil affairs and military police are resident in those units. These same individuals represent the nation's "first responders" to national emergencies. This duality presents a conundrum for the individuals, the Services, and the two departments. What impact will rising Homeland Security budgets have on Defense transformation? At first

⁵⁴ The National Security Act of 1947 established the National Military Establishment (NME) under the leadership of a civilian secretary and placed him co-equal to the Service secretaries of the Army, Navy and new Air Force. The Act also created the Air Force as a separate Service. This NME organizational structure would later form the foundation of the current Department of Defense. The Department of Defense Reorganization Act of 1986 further strengthened and clarified the Secretary of Defense's position in the operation chain, bolstered the position of the Chairman of the Joint Staff by making him the senior ranking member of the armed forces, and shaped joint warfighting concepts.

⁵⁵ Office of the Secretary of Defense. *Quadrennial Defense Review Report 2001*. September 30, 2001. Page 30.

glance, one suspects that a constrained topline defense transformation could suffer. Indeed it could be that the drain may actually complement DOD interoperability and shift certain responsibilities off the military. This would lead us to a zero sum conclusion. One thing is certain; just as DOD must become more cyber-savvy, DHS must as well to maintain interagency interoperability. In many cases, DOD's network centric warfare systems must be able to capture and pass information, seamlessly integrated, for mission success.

Transformation's impact on interoperability remains a concern when used in conjunction with the nation's external friends, allies, and potential coalition partners. Recent operations have seen the U.S. taking on more unilateral action and often leading combat operations because coalition partners either are unequipped or unable to operate with current U.S. military hardware and employment concepts. The administration has encouraged, and at times reprimanded the lack of NATO alliance partners' pursuit of military modernization and reform. Current efforts could broaden the gap between transformed U.S. forces and those of their allies. To combat this, DOD has granted Special Operations Command additional funding and personnel. These special operations forces form the liaison teams tasked with synchronizing coalition operations with those of the U.S. Developing technological bridges for U.S. systems to integrate with the nation's international partners' "legacy" systems could prove difficult and expensive while producing minimal increased combat potential. Will the U.S. military transform itself into a unilateral-only combat force? What impact will this transformation have on current and future international security agreements and alliances? How effective will the special operations linkage be?

Finally, how will Operations Enduring Freedom and Iraqi Freedom change the path of reform and transformation? As U.S. forces continue the efforts in Afghanistan and Iraq, and attempt to deter conflict in Korea, the focus of transformation efforts shifts. DOD and Congress have learned much from experiences in the 1990s, from Iraq to Bosnia and Kosovo. These lessons learned have shaped the current revolution of military affairs and there is no doubt ongoing worldwide intervention will continue to impact military strategists and engineers through the rest of the decade. Each conflict in the past fifteen years has produced significant advances in technology. Desert Storm demonstrated the advantage of global positioning satellites, Kosovo introduced the Joint Direct Attack Munitions, and Afghanistan highlighted the advantage UAVs produce. All these technologies had a significant impact on our future operational strategies. Will ongoing military conflict validate transformation efforts to this point or emphasize shortfalls in concepts and hardware? Will organizational change lead to increased or decreased force structure? Or in the end, will wear and tear on military personnel and equipment shift the focus from transformation to recapitalization of current legacy systems? These last two issues could have a dramatic impact on across the board funding availability.

Status of Transformation Efforts

Office of the Secretary of Defense

The Office of the Secretary of Defense (OSD) oversees the military Services transformation efforts. It has founded its transformation efforts on four pillars listed in the QDR.⁵⁶ These pillars are strengthening joint operations, experimenting with new approaches, exploiting U.S. intelligence advantages, and developing transformational capabilities. The QDR defines the joint forces as scalable, task-organized, and highly networked. In addition, they must be lighter, more lethal, and readily deployed in an integrated force. Fundamental to the effort to strengthen joint operations is to ensure Service interoperability. General Myers stated in Joint Vision 2020, “Interoperability is a mandate for the joint force of 2020 — especially in terms of communications, common logistics items, and information sharing.”⁵⁷ DOD asserts the C4ISR piece of the equation will provide the common operational picture all the Services need to execute their transformational concepts. To ensure this interoperability, the Defense Planning Guidance required each Service to submit a transformation roadmap.⁵⁸ DOD directed these roadmaps to demonstrate how their planned transformation supported the QDR transformation goals. The Service transformation roadmaps allowed DOD to harness and synchronize efforts toward a common joint focus.

Previously, Services developed their own operational concepts without thoroughly coordinating and collaborating with the other branches. Secretary Rumsfeld has ordered the Joint Staff to take the lead in operational concept development, with input from the Services, OSD, and Joint Forces Command. The general DOD strategy has shifted from threat based to a capabilities based framework. These capabilities will guide the development of joint operational concepts and architectures and drive decisions concerning improvements and establish standards for interoperability.⁵⁹ Developing these joint concepts may be complicated by each Service defining how it can best fulfill specific capability requirements. Additionally, concept definition alone does not ensure jointness or interoperability. DOD must continue to monitor efforts to enforce compliance. The Office of Force Transformation’s single focus and greater responsibility placed on the Joint Requirements Oversight Council and Joint Forces Command, is reported to represent an attempt by Secretary Rumsfeld to tighten the reins on Service infighting.

⁵⁶ Office of the Secretary of Defense. *Quadrennial Defense Review Report 2001*. September 30, 2001.

⁵⁷ Joint Chiefs of Staff. *Joint Vision 2020 - America’s Military Preparing for Tomorrow*. June 2000.

⁵⁸ Department of Defense. Background Briefing on Defense Planning Guidance. May 10, 2002.

⁵⁹ Department of Defense. Annual Report to the President and Congress - Equipping Forces for 21st Century Challenges. 2002.

Much of the success of the new operational concepts, organizations, and equipment in the field will depend on ongoing testing and experimentation programs. Identifying the best solutions is critical to choosing the right path to military transformation. The military relies on war games and simulations to provide these solutions. A problem is that most of the premier training areas and facilities are Service owned and operated. Many can not provide the same high fidelity interface when linked to other Services systems. DOD has proposed a Joint Defense-wide National Training Center to overcome this hurdle. Short term, Joint Forces Command has been directed to conduct at least one major joint transformation exercise every other year. Last year's exercise Millennium Challenge 2002 served as a springboard for further experimentation. This type of experimentation is intended to encourage the evolution of new doctrine, organization, education, training, and equipment.

The centerpiece for transformation efforts appears to be information operations. Secretary Rumsfeld has identified a new position, the Under Secretary of Defense for Intelligence, to orchestrate and integrate the department's vast holdings. The U.S. military already possesses unparalleled intelligence gathering, analysis, and processing capability. To maintain this lead and expand it, DOD is moving from platform-centric to network-centric warfare. In short, network-centric warfare is the translation of information superiority into combat power in the form of higher tempo, greater lethality, increased survivability, and self-synchronization. This shift has brought information operations, intelligence, and space assets out of the supporting role they have played for decades to the forefront. DOD now lists these missions as "core capabilities of future forces."⁶⁰ Integral to the establishment of new processes and procedures for legacy systems, the department is pursuing emerging technologies and has put significant dollars behind the effort. This integration of intelligence disciplines, architecture, personnel and equipment is thought to bring improvements to timeliness and quality of overall information. Military priorities for information operations are diverse. They involve the creation of increased capacity networks allowing for a coordinated exchange of information among different levels of command. Additionally, they see a shift from a reconnaissance to a surveillance approach in gathering information on adversary operations. They place emphasis on vital information transfers and on the ability to operate in areas with primitive or nonexistent communications infrastructure. Afghanistan proved the requirements drive for more transmission capability or bandwidth. Lastly, they highlight the significance of a communications infrastructure, especially satellite communications capabilities.⁶¹

OSD has promoted modifications to the acquisition process to encourage transformation. First, it is recapitalizing those legacy forces it deems as "leverage" programs. Recapitalization stretches the gamut from replacement to selected upgrade. These programs are identified as currently meeting capability requirements supporting the six operational goals and with the potential to serve as a springboard

⁶⁰ Office of the Secretary of Defense. *Quadrennial Defense Review Report 2001*. September 30, 2001. page 38.

⁶¹ Joint Chiefs of Staff. Posture Statement of General Richard G. Myers, USAF, Chairman of the Joint Chiefs. House Armed Service Committee. February 6, 2002.

toward joint operational concept advancement or emerging requirements. Examples are the Navy's F/A-18 E/F and the Air Force's C-17.⁶² DOD also has made a committed effort to aim procurement dollars at advanced programs and technologies. Service programs have been scrutinized and some cancelled (the Army's Crusader), others downsized (the Army's Comanche helicopter and the Air Force's F-22 fighter), and still others put on notice (the Navy's new carrier and the Marine Osprey).

The department has shifted more funds into procurement accounts than any administration in almost twenty years. Some argue that this promotes transformation while others say it supports modernization. (The individual Services' transformational programs will be discussed later, but DOD has selected several large programs to support for the joint warfighter.) Broadly speaking, DOD has submitted a budget from FY2004-2009 that increases total investment in RDT&E and procurement by approximately 45% a year. Missile defense, including Patriot Advanced Capability — 3 and the Medium Extended Air Defense System, will receive \$9.1 billion if approved. Over the next two years, the department plans to field a limited ballistic missile defense while funding additional promising technologies. Out year funding provides for the development of a layered missile defense system to intercept ballistic missiles in all phases of flight. With the designation of Special Operations Command as a supported combatant command, the Special Operations Forces stand to receive a 50% increase in funding over FY2003 to \$4.5 billion.⁶³ Unmanned vehicles, such as Global Hawk and Predator UAVs, are budgeted for \$1.4 billion.⁶⁴ This, combined with obligations toward other C4ISR assets like laser, EHF satellite communications, and space-based radar, indicate a commitment toward providing the hardware to advance the network-centric concept.

Department of the Army⁶⁵

The Army defines transformation as a continuous process that creates a culture of innovation that seeks to exploit and shape the changing conduct of military competition. The Army states its transformation objective as a strategically responsive and dominant force at every point on the spectrum of operations. In answering the Defense Planning Guidance requirement, the Army outlines its near term and future plans in the Army Transformation Roadmap.⁶⁶ The thrust of this document is to answer how the Army will close a self-defined "emerging capabilities gap" while moving toward fielding the Objective Force in 2010. Army officials

⁶² For more information on the C-17 see CRS Report RL30685. *Military Airlift: C-17 Aircraft Program*, by Christopher Bolkcom.

⁶³ For more information on the SOF see CRS Report RS21048. *U.S. Special Operations Forces (SOF): Background and Issues*, by Edward Bruner.

⁶⁴ For more information on the UAVs see CRS Report RL31872. *Unmanned Aerial Vehicles: Background and Issues*, by Christopher Bolkcom and Elizabeth Bone.

⁶⁵ For more on Army transformation, see CRS Report RS20787. *Army Transformation and Modernization: Overview and Issues for Congress*, by Edward F. Bruner.

⁶⁶ Department of the Army. *The Army Transformation Roadmap*. Defense Planning Guidance Directed Document. FY2003-2007.

describe the capabilities gap as the area between heavy forces that are well-equipped but difficult to deploy and light forces that respond quickly but without tactical mobility and armor protection. The Army intends a single force that is more responsive, deployable, agile, versatile, lethal, survivable, and sustainable across the spectrum of conflict. As it works toward this Objective Force it understands the effort is constrained not only by DPG 03-07 but also by operational risk.

The Army plans to employ a three-phased time line to transforming its force. In the near term, the fielding of the Stryker Brigade Combat Teams and “digitizing” the legacy force has already commenced.⁶⁷ These efforts begin to fill the gap and enable the current force to harness the ongoing evolution of information operations. The mid-term would bring full fielding of the Stryker Brigades and begin the fielding of the Objective Force. The future continues round-out of the Objective Force while seeking to maximize opportunities to employ technological advancements. Army leadership hopes that this phasing will allow it to transform while still meeting ongoing operational demands and limiting risk. The Army Transformation Campaign Plan serves as its blueprint to achieving and synchronizing transformation success. The document concentrates collective efforts by providing the level of detail required to maximize flexibility and adaptability for innovation and initiative achieved throughout the subsequent phasing.

As the strategic environment has changed, the Army — as well as all joint forces — has had to adapt operational concepts to align with a 21st century multidimensional battlespace. The Army sees joint C2 arrangements and common battlespace awareness enabling a joint operating picture as key to achieving vastly greater decision superiority. Working with Joint Staff, U.S. Joint Forces Command, and OSD’s Office of Net Assessment, the Army works to ensure developmental concepts are capabilities-based, full spectrum, and multidimensional. The Army envisions itself as a network-centric, knowledge-based force. It is focusing on changing the paradigm of ground combat from “make contact-develop the situation-manuever the forces” to one centered on “understand the situation-move the forces-make contact”. This is hoped to enable the Army to substitute information for mass, and helps it achieve strategic and battlefield responsiveness. The Army believes a common picture not only improves combat power but additionally improves logistic sustainment through real-time situational awareness. Army leaders expect this knowledge to further improve responsiveness, reduce logistics footprints, and reduce cost. Additionally, the knowledge could enable the Army to tailor support to the requirement.

By reshaping its conceptual foundations, the Army plans to reshape its organizations. Units of Action will comprise the future warfighting tactical elements of the Objective Force. These organizational constructs will replace today’s brigades and lower tactical echelons. Units of Employment may someday serve to direct

⁶⁷ Digitizing allows a real-time data base that continuously tracks the GPS locations of all friendly systems as provided by various intelligence sources. Appropriate data can be displayed at each vehicle and command level. By 2002, the 4th ID (Mech) was fully digitized. Many other units are partially digitized and all Objective Force and Interim Force units will be fully digitized.

major land operations instead of corps. Near term, the Stryker Brigades of the Interim Force are expected to have 37% fewer combat service support personnel while dramatically improving combat power, deployability, and sustainability. Embedded in these units, according to Army plans, will be intelligence personnel and UAVs to retain the common operational picture on a fluid battlefield. This organizational restructure, officials say, will continue from the field up through the staff to the Army Secretariat and Army Staff. Capitalizing on their communications and automation effort, NETCOM, the Army hopes to streamline its headquarters. Realignment initiatives are thought to help them meet congressionally mandated 15% staff reductions while enhancing policy planning and resource management activities.

The Army's Objective Force and, some would argue, the Army's future hinges on its largest transformational program, the Future Combat System (FCS). In FY2004, the Army and DOD would like to commit \$1.7B to this program. The FCS is billed as the system of systems. It is not a single platform but a family of platforms that include manned and unmanned ground vehicles, unmanned aerial vehicles (UAVs), and soldier robots. Some of the vehicles will weigh between 16 and 20 tons and serve a variety of functions from armored personnel carriers and reconnaissance vehicles to mobile gun systems and C2 platforms. The FCS platforms are expected to operate as part of a constellation of networked sensors, nodes, and joint force platforms. The Army expects to start fielding the FCS in 2010. It will initially serve along side legacy and interim forces. The FCS is not an endstate but is dynamic with new technologies incorporated on a four-year program cycle. This combined with the tailored nature of the Objective Force combat units will complicate long-term cradle-to-grave maintenance and logistics of the unique FCS platforms.

While conceptual and organizational efforts often produce cost savings, the real expense of transformation is tied to the acquisition of technology.⁶⁸ The Army's second largest transformational program this budget cycle is the RAH-66 Comanche helicopter. The Comanche has a \$1.1 billion price tag in the proposed FY2004 budget. The Army states this armed reconnaissance helicopter is critical to its future Objective Force for gathering intelligence and coordinating attacks. It was originally developed as the replacement for a series of 1960s era helicopters. In its current design, it will replace the AH-1 and OH-58 on scout missions. In the fall of 2002, DOD announced Comanche program restructuring and reduced the aircraft total purchase from 1213 to 650. With this restructure, the helicopter is expected to reach IOC in 2009, three years later than originally planned.⁶⁹

The Stryker interim armored wheeled vehicle rounds out the Army's major Transformation program buys through 2007. The vehicle with its ten variants is described as the backbone of the Service's Interim Force. The vehicle, manufactured by General Dynamics Land Systems/General Motors Canada, has already started rolling off the assembly line. The FY2004 defense request is \$.9B with FYDP costs estimated at \$4.4 billion. Two brigades have already formed at Fort Lewis Washington and a total of six brigade combat teams are programmed. The Army

⁶⁸ Department of Defense. *FY 2004 Defense Budget*. February 3, 2003.

⁶⁹ For more information on the RAH-66 see CRS Report RS20522. *Army Aviation: The RAH-66 Comanche Helicopter Issue*, by Christopher Bolkcom.

plans to use lessons learned from its stand-up of the Interim Force to springboard operational concepts for the future Objective Force.

Department of the Navy⁷⁰

The Navy states that its objective for transformation is to greatly expand the sovereign options available to the joint force commander to project power, assure access, and protect and advance America's interests worldwide. The Naval Transformation Roadmap defines how Navy officials believe naval forces will meet tomorrow's challenges through innovation and technology.⁷¹ The Navy's vision for transformation is called Sea Power 21. It incorporates three operational concepts to expand striking power, achieve information dominance, and develop transformational ways of fulfilling the enduring missions of sea control, power projection, strategic deterrence, strategic sealift, and forward presence. These concepts are Sea Strike, Sea Shield, and Sea Basing.⁷²

Sea Strike is the Navy's concept of projecting offensive power from the sea in support of joint operations. While the concept itself is not new, it employs what the Navy defines as transformational capabilities. The capabilities fall into four areas: (1) Persistent intelligence, surveillance, and reconnaissance (ISR). (2) Time sensitive strike. (3) Information operations. (4) Ship-to-objective Maneuver. Relying on improved battlespace awareness generated by naval, joint, and national assets targeteers, the Navy says, will link precision weapons with timely information to increase sovereign firepower. Ship-to-objective maneuver would allow Marine forces to strike directly over-the-horizon at deep inland objectives without establishing beachheads or support bases ashore. The Navy envisions its combined sea and land striking power, when fully integrated in the joint plan, as providing unique independence, responsiveness, and on-scene endurance to joint strike efforts.

Sea Shield is an extension of a traditional Navy mission of fleet defense. In this case, naval assets provide a defensive umbrella to "assure access, reassure allies, and protect the homeland while dissuading and deterring potential adversaries." Again using information superiority and a networked sea force, the Navy intends to provide a layered defense over the world's littorals. Through the transformational capabilities of homeland defense, littoral sea control, and theater air and missile defense, naval forces are to support this operational concept. Forces would orchestrate homeland defense by identifying, tracking and intercepting threats long before they reach the United States. These operations would work in concert with Northern Command to extend security far from the shores. Advancement of technology, the Navy says, will allow it to play a major role in defense against sea-based cruise and ballistic missiles.

⁷⁰ For more on Naval Transformation, see CRS Report RS20851. *Naval Transformation: Background and Issues for Congress*, by Ronald O'Rourke.

⁷¹ Department of the Navy. *Naval Transformation Roadmap: Power and Access...From the Sea*. Defense Planning Guidance Directed Document. FY2003-2007.

⁷² Admiral Vern Clark, U.S. Navy Chief of Naval Operations. *Sea Power 21: Projecting Decisive Joint Capabilities*. Proceedings. October 2002. Pages 32-41.

The Navy says it will also expand its capability to deal with diesel submarines and sea-mines.

Sea Basing is also not a new operational concept for the Navy. In this context, however, the Navy wants to expand the meaning of the term to include the joint force afloat global command and control and logistical support. Using an array of sea-based platforms, the joint force would be able to overcome anti-access and force protection issues while accelerating deployment and employment time lines. Strategic sealift, the Navy says, provides the foundation. At-sea accessible cargo on pre-positioning ships greatly reduces the need for foreign seaports. Sea-based joint forces, as exemplified in operations during Enduring Freedom, provide greater security, immediate employability, and operational independence.

Within the Marine Corps, Expeditionary Maneuver Warfare (EMW) is the foundation concept for transformation. By combining maneuver warfare with the expeditionary culture of the Marines, EMW provides a framework for attaching the concepts of Operational Maneuver from the Sea, Ship-to-Objective Maneuver, and Enhanced Networked Sea-basing. All three gain advantage through extensive use of the sea as a field for tactical maneuver, logistics and resupply, fire-support, and ultimately projecting power and assuring joint success.

Organizationally, the Navy and Marine Corps have implemented several new concepts. Integrating Navy and Marine air assets, Navy officials say, will permit the Department of the Navy to reduce aircraft numbers while maintaining the same level of combat power.⁷³ In order to extend station time on capital ships without overtaxing crews, the Navy is experimenting with rotational crewing. This involves flying successive crews to a ship that is deployed overseas for an extended period of time, reducing steaming time and keeping combat power in the field. As the Navy adds new technology to its fleet, it is also working to reduce the manpower required to operate the ships.⁷⁴

To achieve the full benefits of these operational concepts and organizational changes, the Navy and Marines will pursue some specific technology advancements.⁷⁵ One area targeted for advancements is interagency intelligence and communications reach-back to underpin the Navy's common air and undersea "picture". To facilitate this and its other operational concepts, the Navy is developing ForceNet. ForceNet would be the "operational construct and architectural framework for naval warfare in the information age, integrating warriors, sensors, command and control, platforms, and weapons into a networked, distributed combat

⁷³ For more information on Navy-Marine aircraft integration see CRS Report RS21488. *Navy-Marine Tactical Air Integration Plan: Background and Issues for Congress*, by Christopher Bolkcom and Ronald O'Rourke.

⁷⁴ For more information on ship deployment cycles see CRS Report RS21338. *Navy Ship-Deployment Cycles: Potential New Methods — Background and Issues for Congress*, by Ronald O'Rourke.

⁷⁵ For more information on Network Centric Warfare see CRS Report RS20557. *Navy Network-Centric Warfare Concept: Key Programs and Issues for Congress*, by Ronald O'Rourke.

force.”⁷⁶ Current efforts focus on integrating existing systems, sensors and command and control systems. Additionally, the Navy is pursuing new ship hull designs with modular mission payloads and unmanned combat vehicles, both aerial and undersea platforms. Theater missile defense assets are another technology focus.

CVN 21, the first new carrier design since 1967, is expected to incorporate the latest technological innovations coupled with a flexible structure that will allow insertion of new capabilities as they evolve. A reduction in required crew and design features are expected to reduce ownership costs over its 50-year life span. Based on a DOD decision last fall, many of the advancements planned for a subsequent carrier will be accelerated and built into CVN 21.⁷⁷ Conversion of Trident ballistic submarines to a configuration capable of launching large numbers of land-attack cruise missiles and conducting long duration special operations forces campaigns represents another large Navy program.⁷⁸ The DD(X)⁷⁹, destroyer, and the Littoral Combat Ships, LCS, are additional shipbuilding programs that Navy officials say will contribute to transformation. These ships, according to the Navy, represent technological leaps in warfighting capability, innovation and reliability. They are intended to bolster U.S. capability against anti-access threats. The LCS focuses on new hull designs to provide the firepower of a larger combatant in a smaller, more agile platform with increased survivability and automation.⁸⁰

Major Navy aircraft programs include the Joint Strike Fighter (JSF) and the MV-22, Osprey. Both of these weapon systems are planned for employment with Marine Task Forces. The Short Take-Off and Land (STOVL) version of the JSF is part of the larger buy of tri-Service, next generation strike aircraft. Compared to the Marine Corps’ aging AV-8 STOVL aircraft, the JSF will bring both stealth and greater range with the added benefit of common logistical support and technological superiority at a reduced price. The Navy plans to spend up to \$7.6B on this version of the JSF by the end of the decade. A decision on the long-term future of the MV-22 will come this spring. Marine Corps officials say that the aircraft which takes-off like a helicopter and flies like a plane would bring to the Marines the over-the-horizon assault capability they seek. It has much greater range, speed, and payload than the helicopters it is scheduled to replace. If procured as planned, spending on the aircraft could exceed \$8.2 billion over the FYDP.⁸¹

⁷⁶ Admiral Vern Clark. *Ibid.* Page 37.

⁷⁷ For more information on CVN 21 see CRS Report RS20643. *Navy CVN-21 (formerly CVNX) Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O’Rourke.

⁷⁸ For more information on SSGN conversion see CRS Report RS21007. *Navy Trident Submarine Conversion (SSGN) Program: Background and Issues for Congress*, by Ronald O’Rourke.

⁷⁹ For more information on DD(X) see CRS Report RS21059. *Navy DD(X) Future Surface Combatant Program: Background and Issues for Congress*, by Ronald O’Rourke.

⁸⁰ For more information on the LCS see CRS Report RS21305. *Navy Littoral Combat Ship (LCS): Background and Issues for Congress*, by Ronald O’Rourke.

⁸¹ For more information on the V-22 see CRS Report RL31384. *V-22 Osprey Tilt-Rotor* (continued...)

Department of the Air Force⁸²

The Air Force bills itself as a Service in a constant state of transformation. It asserts transformation is not a one-time improvement but a sustained determined effort combining technology with new concepts that brings rise to organizational changes and new missions. Air Force leaders state battlefield transformation will encompass the horizontal integration of manned, unmanned, and space assets to address emerging and time-critical targets.⁸³ They also assert short-term transformation demands using legacy equipment in new ways. A recently chartered Transformation Senior Steering Group drives transformation within the Air Force. This group provides oversight to the combat and business efforts and ensures coordination of these efforts within DOD. The Air Force Transformation Flight Plan serves as their link between vision and programming documents, and meets the statutory requirements of the QDR.⁸⁴

The Air Force established its Task Force Concepts of Operation to focus transformation efforts across the Service. Each task force, and its accompanying concept, provides the foundation for future capabilities the Air Force would need to support the National Security Strategy. Under these umbrellas are stacked the organizations, capabilities, equipment, and subsequent programs needed to meet the challenges. In theory, these task forces would provide a Joint Force commander with air and space force packages tailored to meet the contingency. The six Task Forces are:

- (1) Space and C4ISR Task Force — Provides fully integrated manned, unmanned and space forces to focus on a particular area of interest and executable decision-quality knowledge to the commander in near real time from anywhere.
- (2) Global Strike Task Force — Rapidly responds to areas where an enemy could attempt to deny access by combining stealth, standoff, precision, space and information with the other Services to create the conditions for access.
- (3) Global Response Task Force — Combines special operations forces and other Services to rapidly respond to global terrorism.

⁸¹ (...continued)

Aircraft, by Christopher Bolkcom.

⁸² For more on Air Force transformation, see CRS Report RS20859. *Air Force Transformation: Background and Issues for Congress*, by Christopher Bolkcom.

⁸³ Department of the Air Force. *Air Force Posture Statement 2002*. Chapter 4 — Transformation.

⁸⁴ Department of the Air Force. *The USAF Transformation Flight Plan FY03-07*. Defense Planning Guidance Directed Document. FY03-07.

- (4) Homeland Security Task Force — Orchestrates specific capabilities as a stand alone, joint, or interagency effort to prevent, protect against, and respond to a variety of threats against the US.
- (5) Global Mobility Task Force — Provides rapid air mobility support to theater combatant commanders across the full spectrum of operations.
- (6) Nuclear Response Task Force — Provides nuclear forces to execute a variety of nuclear attack options.

The organizational framework supporting these task forces is the Air Expeditionary Force. It is a rotation and effects-based force capable of responding to a variety of contingencies while managing high operational tempo. The Air Force extracts required forces from across its breadth and places them on-call for worldwide contingency response. These identified units or capabilities will then stand-down after a specified period of time, ideally 90-days. An AEF contains approximately 12,600 airmen, 90 combat aircraft, 31 mobility/tanker aircraft, and 13 critical combat support aircraft and systems for C4ISR and search and rescue. This construct is meant to meet theater commander requirements for air and space force operational deployment or rapid response.

The Air Force Vision 2020 outlines Air Force long-term strategy and what it believes are its core competencies.⁸⁵ To further focus transformation efforts and experimentation on these core competencies the Air Force has established battlelabs or centers of excellence to generate near-term solutions to operational issues. The labs leverage ongoing training, exercises, and Service expertise to generate, lend, or lease technical capabilities needed to demonstrate and measure promising operational concepts.

As with the other Services, the Air Force sees information superiority requirements driving a large part of its transformation investment. Because the Air Force controls much of the space mission within DOD, many of the C4ISR assets fenced in upcoming budgets are managed as Air Force programs. Beyond space and UAV assets to assist in network-centric warfare is the Multi-Sensor Command and Control Aircraft. This aircraft is expected to provide both a ground and air picture of the battlespace while serving as the hub for the integration of all sensor platforms. While not large in respect to total funding, the Air Force has established a funding line for its Air and Space Operations Center listing it as a separate C2 weapon system. This, they hope, will overcome past incompatibility problems and ensure air operations centers' hardware and software can operate in a timely, standardized manner.

The Air Force's manned aircraft programs carry the greatest bulk of the funding requirements.⁸⁶ It believes stealth is essential to establish air superiority in the years

⁸⁵ Department of the Air Force. *America's Air Force Vision 2020: Global Vigilance, Reach and Power*. [<http://www.af.mil/vision>].

⁸⁶ Department of Defense. *FY2004 Defense Budget*. 3 February 2003.

ahead against rapidly improving air defense systems and fighters.⁸⁷ This appears to have influenced Air Force spending. The F-22 Raptor is the Air Force's future air superiority fighter that incorporates stealth, supercruise, and advanced maneuverability. The aircraft, in design since the 1980s, was originally planned as the replacement for aging F-15s. It is being considered as a ground attack platform as well. Currently the program is capped at a budgetary ceiling with a \$5.2B request in FY2004.⁸⁸ The F-35, Joint Strike Fighter, is expected to conduct most ground attack in the transformed Air Force. It continues in the development and demonstration phase contributing \$4.4 billion to the Air Force FY2004 request.⁸⁹ Unmanned combat aerial vehicles represent the Air Force's future combat platform. To arm legacy and future systems, \$1.4 billion is targeted for advanced precision munitions. The Small Diameter Bomb is hoped to provide the evolutionary capability in new airborne weapons. With increased payloads of these "miniature" all-weather, GPS-directed munitions, the Air Force believes it could exponentially increase combat effectiveness.

Finally, as part of the missile defense funding, the Air Force has three ongoing programs. Space Based Infrared System would enhance detection and tracking of ballistic missiles for national and theater defense. Also, the Airborne Laser would use a high-energy laser mounted on a modified 747 aircraft to intercept and destroy ballistic missiles in their boost phase. The Space Based Laser is a future technology intended to provide the same intercept capability, but with more continuous and comprehensive coverage.

For Additional Reading

CRS Report RS20787. *Army Transformation and Modernization: Overview and Issues for Congress*, by Edward F. Bruner.

CRS Report RS20851. *Naval Transformation: Background and Issues for Congress*, by Ronald O'Rourke.

CRS Report RS20859. *Air Force Transformation: Background and Issues for Congress*, by Christopher Bolkcom.

CRS Report RL30051. *Military Base Closures: Time for Another Round?*, by David E. Lockwood.

CRS Report RL31305. *Authorization and Appropriation for FY2003: Defense*, by Stephen Daggett and Amy Belasco.

⁸⁷ Department of the Air Force. *Air Force Posture Statement 2002*. Chapter 4 — Transformation.

⁸⁸ For more information on the F-22 see CRS Report RL31673. *F/A-22 Raptor*, by Christopher Bolkcom.

⁸⁹ For more information on the JSF see CRS Report RL30563. *Joint Strike Fighter (JSF) Program: Background, Status, and Issues*, by Christopher Bolkcom.

CRS Report RL31425. *Military Transformation: Intelligence, Surveillance and Reconnaissance*, by Judy G. Chizek.

CRS Issue Brief IB96022. *Defense Acquisition Reform: Status and Current Issues*, by Valerie Bailey Grasso.