

CRS Report for Congress

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Defense Transformation: Background and Oversight Issues for Congress

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Summary

The Bush Administration identified transformation as a major goal for the Department of Defense (DOD) soon after taking office and has since worked to refine and implement its plans for defense transformation. The issue for Congress is how to take the concept of defense transformation into account in assessing and acting on Administration proposals for DOD.

The Administration's vision for defense transformation calls for shifting the U.S. military toward a greater reliance on joint operations, network-centric warfare, effects-based operations, speed and agility, and precision application of firepower. To help implement this vision, DOD has created an Office of Force Transformation (OFT), designated U.S. Joint Forces Command (USJFCOM) as its premier "transformation laboratory," and revised weapon acquisition regulations. Transformation could affect the defense industrial base by transferring funding from "legacy" systems to transformational systems, and from traditional DOD contractors to firms that previously have not done much defense work.

Supporters of transformation argue that new technologies make possible the creation of transformational military capabilities, that transformation is required to meet emerging asymmetric security challenges and preserve U.S. superiority in conventional warfare, that the current lack of a global or regional military peer competitor creates an opportunity to invest in transformation at acceptable risk, and that transformation will be less expensive in the long run than continuing to modernize current capabilities. Skeptics could take issue with each of these points.

Debate has arisen over several aspects of the Administration's transformation plan, including overall leadership and management of transformation, the Administration's emphasis on network-centric warfare; the planned total size of the military; the balance between air and ground forces; the creation of medium-weight Army units; the balance of tactical aircraft relative to unmanned air vehicles and bombers; its emphases on missile defense and special operations forces; and its plans regarding reserve forces and forces for stability operations. Potential areas of debate regarding the Administration's proposed strategy for implementing transformation include the balance of funding for transformation vs. near-term priorities; the roles of OFT and USJFCOM; tests, exercises, and metrics for transformation; independent analysis of the Administration's plans; centralization versus decentralization in transformation planning; and actions for creating a culture of innovation.

Some observers are concerned that the Administration's regular (some might even say habitual) use of the term transformation in discussing its proposals for DOD has turned the concept of transformation into an empty slogan or buzz-phrase. Other observers are concerned that the Administration is invoking the term transformation as an all-purpose rhetorical tool for justifying its various proposals for DOD, whether they relate to transformation or not, and for encouraging minimal debate on those proposals by tying the concept of transformation to the urgent need to fight the war on terrorism. This report will be updated as events warrant.

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Defense Transformation: Background and Oversight Issues for Congress

Introduction

Issue For Congress

The Bush Administration identified transformation as a major goal for the Department of Defense (DOD) soon after taking office and has since worked to refine and implement its plans for defense transformation. The Administration argues that defense transformation is needed to effectively meet 21st-century security challenges, and has justified many of its proposals for DOD on the grounds that they are needed for defense transformation. The Administration's emphasis on transformation has altered the framework of debate for numerous issues relating to U.S. defense policy and programs.

The issue for Congress is how to take the concept of defense transformation into account in assessing and acting on Administration proposals for DOD. Key oversight questions for Congress relating to this issue include the following:

- Is defense transformation necessary or desirable?
- If so, is the Administration's plan for defense transformation appropriate in terms of content and implementation strategy?
- What implications might the Administration's plan for defense transformation have for congressional oversight of DOD activities?

Congress' decisions on these issues could have significant implications for future U.S. military capabilities, DOD funding requirements, the defense industrial base, and future congressional oversight of DOD activities.

Related CRS Reports

This report addresses defense transformation from a DOD-wide perspective. For discussions of transformation as it relates to specific parts of DOD, see:

- CRS Report RS20787 on Army transformation in general,¹
- CRS Report RL32476 on the Army’s plan to reorganize itself into modular, brigade-sized, Units of Action (UAs) — a major component of its overall transformation effort;²
- CRS Report RS20859 on Air Force transformation,³
- CRS Report RS20851 on naval transformation,⁴
- CRS Report RL32411 on network-centric warfare,⁵
- CRS Report RL31425 on transformation of DOD intelligence, surveillance, and reconnaissance programs,⁶
- CRS Report RL32151 on transformation of the military personnel system,⁷ and
- CRS Report RS21975 on U.S. overseas military basing arrangements.⁸

Another related product is CRS Report RL31916, which reviews a large package of legislative proposals, entitled “Defense Transformation for the 21st Century Act of 2003,” that the Administration submitted to Congress in April 2003.⁹

Organization of the Report

The next section of this report provides basic background information on defense transformation. The following section addresses key oversight questions for Congress. An appendix provides a list of additional readings.

¹ CRS Report RS20787, *Army Transformation and Modernization: Overview and Issues for Congress*, by Edward F. Bruner.

² CRS Report RL32476, *U.S. Army’s Modular Redesign: Issues for Congress*, by Andrew Feickert.

³ CRS Report RS20859, *Air Force Transformation*, by Christopher Bolkom.

⁴ CRS Report RS20851, *Naval Transformation: Background and Issues for Congress*, by Ronald O’Rourke.

⁵ CRS Report RL32411, *Network Centric Warfare: Background and Oversight Issues for Congress*, by Clay Wilson.

⁶ CRS Report RL31425, *Military Transformation: Intelligence, Surveillance, and Reconnaissance*, by Judy G. Chizek.

⁷ CRS Report RL32151, *DOD Transformation Initiatives and the Military Personnel System: Proceedings of a CRS Seminar*, by Lawrence Kapp.

⁸ CRS Report RS21975, *U.S. Military Overseas Basing: Background and Oversight Issues for Congress*, by Jon D. Klaus.

⁹ CRS Report RL31916 *Defense Department Original Transformation Proposal: Compared to Existing Law*, by Robert L. Goldich, et al.

Background

This section provides basic background information on the concept of defense transformation and the Administration's plans for defense transformation. Questions addressed in this section include the following:

- What is defense transformation?
- What are the Administration's plans for defense transformation?
- How much would defense transformation cost?
- What military weapons and systems are considered transformational?
- How might the Administration's transformation plans, if implemented, affect the U.S. defense industrial base?
- What implications might defense transformation have for the ability of U.S. military forces to participate in combined operations with the military forces of allied and friendly countries?

What Is Defense Transformation?

The term defense transformation came into common use in the late 1990s. It has been defined by military officials, military analysts, and other observers in various ways. In general, though, defense transformation can be thought of as large-scale, discontinuous, and possibly disruptive changes in military weapons, organization, and concepts of operations (i.e., approaches to warfighting) that are prompted by significant changes in technology or the emergence of new and different international security challenges.¹⁰

Advocates of defense transformation stress that, in contrast to incremental or evolutionary military change brought about by normal modernization efforts, defense transformation is more likely to feature discontinuous or disruptive forms of change. They also stress that while much of the discussion over transformation centers on changes in military weapons and systems, changes in organization and concepts of operations can be as important, or even more important, than changes in weapons and systems in bringing about transformation. Changes in organization and concepts of operation, some have argued, can lead to transformation even without changes in weapons and systems, while even dramatic changes in weapons and systems might not lead to transformation if not accompanied by changes in organization and concepts of operation.

¹⁰ Some transformation advocates argue that transformation can and should be pursued during periods of military dominance and political stability. They argue that countries that are defeated in military conflicts learn much faster from their experience in war than do countries that are victorious. Victorious countries, they argue, can become complacent, making only incremental improvements to military forces and concepts of operations that appear dominant, and are then unpleasantly surprised in subsequent conflicts by adversaries that, in the meantime, have developed new and unforeseen military capabilities.

DOD has defined transformation in one document as a

process that shapes the changing nature of military competition and cooperation through new combinations of concepts, capabilities, people and organizations that exploit our nation's advantages and protect against our asymmetric vulnerabilities to sustain our strategic position, which helps underpin peace and stability in the world.

First and foremost, transformation is a continuing process. It does not have an end point. Transformation anticipates and creates the future and deals with the co-evolution of concepts, processes, organizations, and technology. Profound change in any one of these areas necessitates change in all. Transformation creates new competitive areas and competencies and identifies, leverages, or creates new underlying principles for the way things are done. Transformation also identifies and leverages new sources of power. The overall objective of these changes is to sustain U.S. competitive advantage in warfare.¹¹

The Administration's view of transformation has evolved somewhat since early 2001 to include more emphasis on transformation as a continuing process rather than one with an endpoint, and on making changes not just in combat forces and warfighting doctrine, but in supporting DOD activities such as training, personnel management, logistics, and worldwide basing arrangements. The Administration's definition of transformation also encompasses making changes in DOD business policies, practices, and procedures, particularly with an eye toward streamlining operations and achieving efficiencies so as to reduce costs and move new weapon technologies from the laboratory to the field more quickly. The Administration has also used the term transformation to refer to proposed changes in matters such as the budget process and environmental matters affecting military training.

Some observers have equated transformation principally with the idea of making U.S. forces more mobile, agile, and lethal through greater reliance on things such as unmanned vehicles (UVs), advanced technologies for precision-strike operations, and special operations forces (SOF). Other observers have equated transformation principally with the concept of network-centric warfare (NCW)¹² and the C4ISR¹³ technologies needed to implement NCW. Still others have equated transformation primarily with making U.S. military forces more expeditionary,¹⁴ with making order-of-magnitude improvements in specific military capabilities, with making many

¹¹ U.S. Department of Defense, Office of the Secretary of Defense, Director, Force Transformation, *Military Transformation[:] A Strategic Approach*, Fall 2003, p. 8.

¹² NCW refers to using networking technology — computers, data links, and networking software — to link U.S. military personnel, ground vehicles, aircraft, and ships into a series of highly integrated local- and wide-area networks capable of sharing critical tactical information on a rapid and continuous basis.

¹³ C4ISR stands for command, control, communications, computers, intelligence, surveillance, and reconnaissance.

¹⁴ In general, this means making U.S. forces more capable of rapidly moving to distant operating areas and conducting operations in those areas with less reliance on pre-existing in-theater bases, infrastructure, or supplies.

smaller improvements that add up to larger improvements, or with the notion of weapon modernization in general.

Some of these alternative formulations are not so much definitions of transformation as prescriptions for how U.S. military forces should be transformed. Others can be viewed as reducing the threshold of what qualifies as transformation by including changes that, while perhaps dramatic, represent an elaboration of current practices and arrangements rather than something discontinuous with or disruptive of those practices and arrangements.

Related to the concept of defense transformation is the somewhat earlier term Revolution in Military Affairs (RMA), which came into use in the early 1990s.¹⁵ RMAs are periodic major changes — discontinuities — in the character of warfare. Depending on the source consulted, a few or several RMAs are deemed to have occurred in recent decades or centuries. Although the terms transformation and RMA have sometimes been used interchangeably, RMA can be used to refer to a major change in the character of warfare, while transformation can be used to refer to the process of changing military weapons, concepts of operation, and organization in reaction to (or anticipation of) an RMA.

What Are The Administration's Plans For Transformation?

DOD Publications. DOD has published a number of documents describing the Administration's plans for defense transformation. Among these are *Elements of Defense Transformation*, published in October 2004, *Military Transformation: A Strategic Approach*, published in the fall of 2003, *Transformation Planning Guidance*, published in April 2003, and separate transformation plans (called road maps) for each of the military services. These and other DOD publications on transformation are listed in the appendix to this CRS report, and can also be found at the website for DOD's Office of Force Transformation [<http://www.oft.osd.mil>].

Overall Vision. In general, the Administration's vision for defense transformation calls for shifting the U.S. military away from a reliance on massed forces, sheer quantity of firepower, military services operating in isolation from one another, and attrition-style warfare,¹⁶ and toward a greater reliance on joint (i.e., integrated multi-service) operations, NCW, effects-based operations (EBO),¹⁷ speed

¹⁵ The term RMA was a reformulation of the even earlier term, Military Technical Revolution (MTR), which was coined by Soviet military analysts during the Cold War to refer to fundamental changes in warfare that are brought about by major new technologies, such as nuclear weapons. Western military analysts, concerned that the term MTR placed too exclusive an emphasis on changes in technology, created the term RMA so as to take into account changes in military organization and concepts of operations as well.

¹⁶ Attrition-style warfare refers to a traditional warfighting strategy that focuses on seeking out the enemy's military forces, wherever they might be, and then using firepower to destroy them piece by piece, through a process of gradual attrition, until the enemy is no longer capable of fighting effectively.

¹⁷ Effects-based operations, also called effects-based warfare, refers to a warfighting strategy that has been proposed as an alternative to traditional attrition-style warfare. Rather
(continued...)

and agility, and precision application of firepower. Some transformation advocates characterize these changes as shifting from an industrial-age approach to war to an information-age approach. As mentioned earlier, the Administration's transformation vision also includes proposals for changing things like training practices, personnel management practices, logistics operations, and worldwide basing arrangements, and for changing DOD's business practices, particularly with an eye toward streamlining those practices so as to accelerate the fielding of new weapons and generate savings that can be used to invest in them.

DOD states that its transformation effort is focused on achieving six "critical operational goals" and consists of four essential "pillars:"

Six critical operational goals identified by Secretary of Defense Donald H. Rumsfeld provide the focus for the Department's transformation efforts: (1) Protecting critical bases and defeating chemical, biological, radiological, and nuclear weapons; (2) Projecting and sustaining forces in anti-access environments; (3) Denying enemy sanctuary; (4) Leveraging information technology; (5) Assuring information systems and conducting information operations; and (6) Enhancing space capabilities. Over time, the continued focus of the Department's force transformation efforts on the development of the capabilities necessary to achieve these six critical operational goals will help shift the balance of U.S. forces and broaden our capabilities....

The four military transformation pillars identified by the Secretary — strengthening joint operations, exploiting U.S. intelligence advantages, concept development and experimentation, and developing transformational capabilities — constitute the essential elements of the Department's force transformation strategy. The first pillar focuses on strengthening joint operations through the development of joint concepts and architectures and the pursuit of other important jointness initiatives and interoperability goals. The overarching *Joint Operations Concepts (JOpsC)* document provides the operational context for military transformation by linking strategic guidance with the integrated application of Joint Force capabilities. The second pillar involves exploiting U.S. intelligence advantages through multiple intelligence collection assets, global surveillance and reconnaissance, and enhanced exploitation and dissemination. Our ability to defend America in the new security environment requires

¹⁷ (...continued)

than focusing on seeking out and destroying enemy forces wherever they might be, effects-based operations focuses on attacking selected key elements of the enemy's ability to fight in a coordinated manner. Under an effects-based strategy, U.S. forces might attack the enemy's military leadership, its military command-and-control systems, and the most politically and militarily significant elements of the enemy's fielded military forces while bypassing less significant enemy military forces. The goal of effects-based warfare is to create specific effects on the enemy that lead to a rapid collapse of the enemy's willingness and ability to fight, without having to go through a time-consuming and potentially costly effort to destroy the bulk of the enemy's military forces through a gradual process of attrition.

Some observers argue that the concept of effects-based operations is not new and has been employed in past conflicts. Observers also argue, however, that new technologies may significantly increase the effectiveness of effects-based operations.

unprecedented intelligence capabilities to anticipate where, when, and how adversaries intend to harm us.

The third pillar, concept development and experimentation, involves experimentation with new approaches to warfare, operational concepts and capabilities, and organizational constructs through war gaming, simulations, and field exercises focused on emerging challenges and opportunities. Experiments designed to evaluate new concepts provide results that help refine those concepts in an iterative fashion. [Regarding the fourth pillar, the] Department requires strong mechanisms for implementing results from concept development and experimentation and, more immediately, for developing transformational capabilities needed to support the JOpsC and subordinate Joint Operating Concepts.¹⁸

Service and Agency Transformation Plans. The military services and DOD agencies have developed transformation plans or road maps in support of DOD's overall transformation vision.

The Army's transformation plan centers on reorganizing the Army into modular, brigade-sized forces called Units of Action (UAs) that can be deployed to distant operating areas more easily and can be more easily tailored to meet the needs of each contingency.

Key elements of the Air Force's transformation plan include reorganizing the service to make it more expeditionary, and exploiting new technologies and operational concepts to dramatically improve its ability to rapidly deploy and sustain forces, to dominate air and space, and to rapidly identify and precisely attack targets on a global basis.

Key elements of naval transformation include a focus on operating in littoral (i.e., near shore) waters, new-design ships requiring much-smaller crews, directly launching and supporting expeditionary operations ashore from sea bases, more flexible naval formations, and more flexible ship-deployment methods.

Elements common to the transformation plans of all the services include greater jointness, implementing NCW, and greater use of unmanned vehicles (UVs). As mentioned earlier, for more on the transformation plans of the Army in general, the Army plan for UAs, the Air Force, and the Navy, see CRS Report RS20787, CRS Report RL32476, CRS Report RS20859, and CRS Report RS20851, respectively.

Office of Force Transformation. To help implement transformation, DOD created the Office of Force Transformation (OFT), which resides within the Office of the Secretary of Defense (OSD). OFT is a small office with a staff of fewer than 30 people and an FY2004 budget of about \$30 million. Among other things, OFT issues guidance to the rest of DOD on transformation; reviews and approves transformation plans submitted by the military services and DOD agencies; acts as a generator, promoter, and clearinghouse of ideas for transformation; and generally evangelizes in support of transformation. OFT is currently headed by retired Navy

¹⁸ *Military Transformation[:] A Strategic Approach*, op cit., p. 3.

Vice Admiral Arthur K. Cebrowski. Cebrowski was previously the President of the Naval War College, where he was a leading proponent of the then-emerging concept of NCW and initiated studies on radically new kinds of Navy warships.

U.S. Joint Forces Command. As another measure to help implement transformation, DOD designated U.S. Joint Forces Command (USJFCOM), a unified military command with a staff of more than 800 headquartered in Norfolk, VA, as the military's premier "transformation laboratory." USJFCOM states that its commander, currently Admiral Edmund P. Giambastiani, Jr., is responsible for, among other things, overseeing USJFCOM's

roles in transformation, experimentation, joint training, interoperability and force provision as outlined in the Department of Defense's Unified Command Plan.

The Department of Defense appointed U.S. Joint Forces Command as the "transformation laboratory" of the United States military that serves to enhance the unified commanders' capabilities to implement that strategy. We develop concepts, test these concepts through rigorous experimentation, educate joint leaders, train joint forces, and make recommendations on how the Army, Navy, Air Force and Marines can better integrate their warfighting capabilities.

USJFCOM develops future concepts for joint warfighting.... The overarching transformation concept, effects-based operations (EBO)[,] is the benchmark in which all testing, concept development and training adheres.

The joint force concept development and experimentation focus is an inherent component of this mission, and will transport the EBO concept to reality. Joint force integrator evaluates and prioritizes the solutions that support EBO. The joint force trainer role allows USJFCOM to rapidly introduce new doctrine and receive immediate feedback from the warfighters. And the role as joint force provider will monitor and deploy these effects-based forces to combatant commanders for the variety of missions they are tasked to perform.¹⁹

New Weapon Acquisition Regulations. As a fourth step to help implement transformation, the Administration has revised the regulations governing the acquisition of new weapons and systems with the aim of reducing costs and "acquisition cycle time" — the time needed to turn useful new technologies into fielded weapon systems. A key element of DOD's effort in this regard is evolutionary acquisition with spiral development (EA/SD), which DOD has identified is its new preferred acquisition strategy. EA/SD is an outgrowth of the defense acquisition reform movement of the 1990s and is intended to make its acquisition system more responsive to rapid changes in threats, technology, and warfighter needs. For more on EA/SD, see CRS Report RS21195.²⁰

¹⁹ [<http://www.jfcom.mil/about/about1.htm>].

²⁰ CRS Report RS21195, *Evolutionary Acquisition and Spiral Development in DOD Programs: Policy Issues for Congress*, by Gary J. Pagliano and Ronald O'Rourke.

How Much Would Transformation Cost?

Much of the interest in Congress and elsewhere about defense transformation centers on the question of how much it might cost. Calculating the potential cost of defense transformation is not an easy matter, for the following reasons:

- Opinions differ, often significantly, on what kinds of planned changes for DOD qualify as transformational, and which do not.
- Developing and acquiring new weapons and equipment that are deemed transformational can be very expensive, but the cost of this can be offset, perhaps substantially or even completely, by reducing or cancelling the development and procurement of non-transformational weapons and equipment that would no longer be needed.
- Implementing transformational changes in organization can also cost money, but these costs might similarly be offset by the reduced recurring cost of maintaining the new forms of organization.
- While exercises intended to explore new warfighting concepts of operation can be expensive, the cost of staging these exercises can be offset by curtailing other exercises that are intended to further develop older concepts of operations.
- If transformation is viewed as a continuing process rather than one with an endpoint, any calculations of its cost become snapshots rather than final figures.

Since the initial stages of the Administration's transformation plan might involve making changes to only a relatively small fraction of the force, the near-term net cost impact of transformation may be somewhat limited.

Although some analysts who advocate defense transformation might personally support increased spending on defense, most appear to advocate transformation as a cost-neutral or cost-reducing proposition. Indeed, some advocates support their proposals for transformation on the grounds that they represent a less expensive strategy for meeting future security challenges than the alternative of investing in programs for making more incremental or evolutionary changes to current military capabilities. Some analysts have gone even further, arguing that an increasing defense budget might actually impede transformation by permitting officials to believe that projected security challenges can be solved by investing larger amounts of funding in today's military forces, while a constrained or declining defense budget, conversely, might help encourage transformation by forcing officials to contemplate more seriously the idea of shifting to new and less expensive approaches for meeting these challenges.

The Administration has stressed that its interest in incorporating current best private-sector business practices in DOD operations, and in running DOD more "like a business," is driven in large part by a desire to run DOD more efficiently and

thereby generate maximum savings that can be used for, among other things, investing in transformation.

In early 2003, the Administration stated that its proposed FY2004 defense budget was the first to reflect in a significant way its plans for transformation. The Administration stated that this budget included a total of about \$24 billion for investments that it considered transformational, and that the FY2004-FY2009 Future Years Defense Plan (FYDP) accompanying the proposed FY2004 budget contained a total of \$82 billion in various savings initiatives intended to help finance transformation.

In February 2004, the Administration stated that its proposed FY2005 defense budget included a total of about \$29 billion for investments that it considered transformational.

What Weapons And Systems Are Transformational?

Although transformation involves significant changes in organization and concepts of operations, much of the debate over transformation has centered on which military weapons and systems should be deemed transformational, and which not. Experts disagree on this question, even when working from a common definition of transformation. As a result, lists of weapons and systems that qualify as transformational differ from one source to the next.

Supporters of various weapon procurement programs, keenly aware of the Administration's interest in transformation, have been eager to argue that their own favored weapon systems should be viewed transformational, or at least not as "legacy" — a label that in some eyes has become synonymous with obsolescence and suitability for reduction or termination.²¹ As a result, a wide variety of military weapons and systems have been presented at one point or another as transformational, while fewer have been spotlighted as non-transformational or legacy.

Weapons and systems that have frequently been identified as closely associated with the Administration's transformation vision include but are not necessarily limited to the following:

- C4ISR systems that link U.S. and coalition military units into highly integrated networks for conducting NCW,
- forces for countering terrorists and weapons of mass destruction,
- space systems,
- missile defense,

²¹ The term "legacy" was originally a policy-neutral term used to refer to existing or current-generation weapons that, while not transformational, could well be worth procuring or maintaining in inventory, at least for some number of years. Over time, however, the term "legacy" has come to be used in a more pejorative manner, to refer to systems that are not only not transformational, but obsolescent and ripe for immediate termination or elimination.

- unmanned vehicles,
- special operations forces,
- precision-guided air-delivered weapons,
- lighter and more mobile Army ground forces, and
- smaller and faster Navy surface ships.

Weapons and systems that have been identified by various observers, not necessarily by DOD, as non-transformational or legacy include the following:

- weapons and associated C4ISR systems that operate in an isolated, stand-alone manner rather than as part of a network,
- unguided weapons,
- heavy armored forces for the Army,
- manned tactical aircraft, and
- large, slower-moving Navy surface ships.

How Might It Affect the Defense Industrial Base?

A related matter of interest to Congress is how the Administration's transformation plans, if implemented, might affect the composition of U.S. defense spending and, as a consequence, revenues and employment levels of various firms in the defense industrial base. In assessing this issue, potential points to consider include the following:

- **Transformational vs. non-transformational/legacy programs.** To some degree, implementing the Administration's transformation vision could lead to increased DOD spending on the items listed above as transformational, and more restrained amounts of spending on the items listed above as non-transformational or legacy.
- **Large-scale systems integration work.** Implementing the Administration's transformation plan could lead to increased DOD spending for the large-scale systems integration work that is required to tie individual military weapons and systems together into smoothly functioning "systems of systems." Some defense firms, particularly some of the larger ones, have taken steps to strengthen and publicize their capacity for performing this kind of work.
- **Large, diversified contractors vs. specific units within them and smaller firms.** For larger defense firms that perform a wide range of work for DOD,²² implementing the Administration's transformation plan might transfer revenues from one part of the company to another without necessarily having a major effect on the company's bottom line. The potential effect on individual units within those firms, however, may be greater, if those facilities

²² Examples of such firms would include Boeing, General Dynamics, Lockheed Martin, Northrop Grumman, and Raytheon — the 5 leading U.S. defense contractors that emerged from the consolidation of the defense sector that began in the early 1990s.

specialize in producing only certain kinds of defense goods or services. These units — as well as smaller defense firms that perform a less-diverse array of work for DOD — may be more likely to experience either an increase or decrease in revenues and employment levels as a result of transformation.²³

- **Traditional vs. non-traditional DOD contractors.** Some new technologies that may contribute to transformation, particularly certain information technologies, are found more in the civilian economy than in the world of defense-related research. As a result, implementing the Administration’s transformation plan could shift some DOD spending away from traditional DOD contractors and toward firms that previously have done little or no business with DOD. Indeed, DOD is currently attempting to encourage firms that have not previously done business with DOD — so-called “non-traditional” contractors — to begin doing business with DOD, so that DOD may make maximum use of applicable technologies from the civilian sector.

How Might It Affect Operations With Allied Forces?

What implications might defense transformation have for the ability of U.S. military forces to participate in combined operations with the military forces of allied and friendly countries? DOD states that it is working toward a transformed force capable of conducting effective combined operations:

As the U.S. military transforms, our interests are served by making arrangements for international military cooperation to ensure that rapidly transforming U.S. capabilities can be applied effectively with allied and coalition capabilities. U.S. transformation objectives should be used to shape and complement foreign military developments and priorities of likely partners, both in bilateral and multilateral contexts.²⁴

In spite of this stated intention, however, other observers, including some in allied and friendly countries, have expressed concern that U.S. defense transformation could widen the current gap between U.S. and foreign military concepts and capabilities, which is already quite significant in some respects, and thereby make U.S. forces less compatible with allied and friendly forces. Reduced compatibility, they believe, could lead to reduced coalition warfighting effectiveness when the United States engages in combined operations with allied and friendly forces, increased risk of fratricide (i.e., friendly-fire) incidents involving U.S. and coalition forces, and increased risk of political friction between the United States and its coalition partners.

²³ For more on the potential effects of transformation on the industrial base, see Peter J. Dombrowski, Eugene Gholz, Andrew L. Ross, *Military Transformation and the Defense Industry after Next* [:] *The Defense Industrial Implications of Network-Centric Warfare, Final Report*, Newport Paper #18, (Newport: Naval War College, 2003).

²⁴ *Military Transformation*[:] *A Strategic Approach*, op cit., p. 10.

Whether transformation strengthens or weakens the ability of U.S. forces to participate in combined operations with foreign military forces will depend in part on decisions made by foreign governments. If these governments, for example, invest in networking technologies for NCW that are compatible with those used by U.S. forces, it could increase interoperability with U.S. military forces to a level that was not possible in pre-NCW times. Conversely, if those governments do not significantly invest in networking-related technologies for NCW, or invest in technologies that are not compatible with those of U.S. forces, it could reduce interoperability between U.S. forces and the forces of those countries below what it is today. Under this latter scenario, operations involving U.S. and foreign military forces might be combined operations in name only, with the foreign forces assigned to marginal or other functions that can be performed acceptably without being fully incorporated into the U.S. network or without creating complications.

Future interoperability with foreign military forces will also depend in part on decisions made together by U.S. and foreign leaders. Decisions that align emerging U.S. concepts of operations with those of foreign military forces, and to hold combined exercises employing these new concepts of operations, could improve the potential for conducting effective combined operations. Conversely, lack of coordination in emerging concepts of operations, or of exercises to practice them together, could impede interoperability and reduce the potential for effective combined operations.

What Transformational Changes Has Congress Initiated?

Congress in past years has instituted changes that can be viewed as examples of, or contributors to, defense transformation, including changes that were opposed (or at least not proposed or actively supported) by DOD leaders. Examples of such actions include the following:

- Congress played a leading role in promoting jointness within DOD by creating the landmark 1986 Goldwater-Nichols Act (P.L. 99-433), which, among other things, strengthened the institutional roles played by the Joint Chiefs of Staff and the commanders in charge of joint forces assigned to various regions around the world. Although the term defense transformation was not in common use in 1986, the Goldwater-Nichols Act today can be viewed, in retrospect, as a significant early example of defense transformation.²⁵
- Congress in 1986 also expressed concern for the status of SOF within overall U.S. defense planning and passed legislation — Section 1311 of the FY1987 defense authorization act (P.L. 99-661) — to strengthen its position. Among other things, Section 1311 established the U.S. Special Operations Command (USSOCOM) as a new unified command. To the extent that enhancement of special

²⁵ For background information on the Goldwater-Nichols Act, see CRS Report RL30609, *Department of Defense Reorganization Act of 1986: Proposals for Reforming the Joint Officer Personnel Management Program*, by Katherine Lemay Brown, pp. 2-5.

operations forces is now considered a key element of defense transformation, this action also can be viewed, in retrospect, as an early example of transformation.

- In 2000, Congress passed legislation — Section 220 of the FY2001 defense authorization act (P.L. 106-398) — that established a transformation-related goal for unmanned vehicles. The provision stated that “It shall be a goal of the Armed Forces to achieve the fielding of unmanned, remotely controlled technology such that — (1) by 2010, one-third of the aircraft in the operational deep strike force aircraft fleet are unmanned; and (2) by 2015, one-third of the operational ground combat vehicles are unmanned.”

Oversight Issues for Congress

This section addresses the following potential oversight issues for Congress:

- Is defense transformation necessary or desirable?
- If so, is the Administration’s plan for defense transformation appropriate in terms of content and implementation strategy?
- What implications might the Administration’s plan for defense transformation have for congressional oversight of DOD activities?

Is Defense Transformation Necessary or Desirable?

Particularly now that the Administration is proposing to begin increasing spending on programs that it connects with transformation, one potential oversight issue for Congress is whether transformation is necessary or desirable. Supporters of the notion that transformation is necessary or desirable make five general arguments:

- New technologies make possible the creation of new, transformational military capabilities.
- Transformation is required to meet emerging asymmetric security challenges.
- Transformation is also required to preserve U.S. superiority in conventional warfare over the long run.
- The current lack of a global or regional military peer competitor creates an opportunity — a window in time — to invest in transformation at acceptable risk.
- Transformation will be less expensive in the long run than attempting to meet emerging asymmetric threats or preserve U.S. conventional superiority through more routine modernization of current capabilities.²⁶

²⁶ For lengthier versions of the arguments for transformation as articulated by DOD, see pages 12-16 of *Military Transformation[:] A Strategic Approach*, op cit, or pages 4-6 of (continued...)

New Technologies. Supporters of transformation argue that advanced information technologies, as well as new technologies for distributed sensors, unmanned vehicles, and precision-guided munitions, make possible the creation of new, transformational military capabilities in the form of agile, distributed forces armed with precision-guided weapons that can operate in a network-centric environment so as to conduct effects-based operations. Incorporating these new technologies into today's forces without undergoing transformational changes in organization and concepts of operation, they argue, would waste much of the potential warfighting benefit afforded by these technologies.

Skeptics could argue that although new technologies make transformation possible, that doesn't necessarily mean that transformation is necessary or desirable right now. These technologies, they could argue, can be incorporated into U.S. forces through routine modernization of existing capabilities, without making transformational changes in organization and concept of operation. The notion that transformational change is needed to adequately capture the benefits of these new technologies, they could argue, is theoretical and unproven. Changes in organization and concepts of operation, they could argue, can always be made later, if practical experience shows that incorporating these technologies through routine modernization does not adequately exploit their warfighting potential.

Asymmetric Challenges. Supporters of transformation argue that transformation is needed to counter emerging asymmetric military challenges, in which adversaries avoid competing head-on against conventional U.S. military strengths. Emerging asymmetric challenges that transformation supporters cite include (but are not necessarily limited to) terrorism; nuclear, chemical, and biological weapons; long-range ballistic and cruise missiles; cyberwarfare; attacks on U.S. military satellites; and anti-access/area-denial (AA/AD) systems aimed at preventing U.S. forces from gaining access to ports, airfields, bases, staging areas, and littoral (near-shore) waters that U.S. forces now depend on to mount military operations in distant theaters.²⁷ Routine modernization of current U.S. military forces, they argue, will not provide forces well suited to countering these emerging asymmetric challenges.

Skeptics could argue that asymmetric military challenges may require certain enhancements to current U.S. military capabilities, but that these enhancements can be made by adding or expanding selected military capabilities, or through routine modernization of current capabilities. For example, they could argue, intelligence capabilities and special operations forces can be strengthened to counter terrorism, and ballistic missile defenses can be fielded, without requiring significant changes to other parts of the military. Asymmetric challenges, they could argue, are nothing new — the United States has long had to contend with thinking adversaries that could adapt and change — and DOD has successfully dealt with such challenges in the past without undertaking transformational changes.

²⁶ (...continued)

Transformation Planning Guidance, op cit.

²⁷ Examples of AA/AD systems include shorter-ranged ballistic and cruise missiles, mines, and non-nuclear-powered submarines.

Preserving Conventional Superiority. Supporters of transformation argue that transformation is also needed ensure that the current U.S. superiority in conventional warfare does not erode over time. Many of the key technologies that are involved in U.S. defense transformation, including information technologies, they argue, are widely available and will be similarly exploited by the military forces of potential U.S. adversaries. Consequently, they argue, routine modernization of current U.S. military forces that does not take full advantage of these new technologies will not be sufficient to preserve current U.S. superiority in conventional warfare.

Skeptics could argue that transformation is not necessarily required to preserve U.S. conventional superiority over the long run. They could argue that, as demonstrated by recent major combat operations in Kosovo, Afghanistan, and Iraq, the current degree of U.S. superiority in conventional warfare is so large, and the potential cost for other countries to challenge that superiority (even with use of new technologies and concepts of operations) is so high, that challenges to U.S. conventional superiority are unlikely, and that any challenges that do occur would require many years to implement. Consequently, they could argue, routine modernization efforts will be sufficient to preserve U.S. conventional superiority for many years.

Opportunity And Risk. Transformation supporters argue that the current lack of a worldwide or major regional military peer competitor to the United States creates an opportunity — a window in time — that permits the United States, at acceptable risk, to shift some funds away from nearer-term routine modernization programs and toward longer-term efforts aimed at creating new, transformational military capabilities. Putting off transformation until the emergence of a military peer competitor, they argue, would not only make it more difficult for the United States to respond to that competitor, but could also make the emergence of such competitors more likely by encouraging potential competitors to believe that the United States was neglecting to maintain its superiority in conventional warfare.

Other transformation supporters argue that current U.S. operations in Iraq, Afghanistan, the Balkans, and other locations is accelerating transformation by prompting rapid, battle-induced changes in U.S. technology, organization, and concepts of operations. They also argue that U.S. operations in these locations promote transformation because the return of individual U.S. units from these locations at the ends of their periods of deployment provides a natural opportunity to “reset” those units to a new, transformed organization.²⁸

Skeptics could argue that current operational demands on U.S. forces in Iraq, Afghanistan, the Balkans, and other locations, far from creating a window of opportunity for transformation, increase the risks of attempting transformation right now. Shifting funds away from near-term readiness and modernization and toward longer-term efforts aimed at transformation, and making changes in organization and

²⁸ See, for example, Jefferson Morris, “Iraq Operations Accelerating Transformation, Cebrowski Says,” *Aerospace Daily & Defense Report*, August 4, 2004; and Sandra Jontz, “Schoomaker: War Aids Transformation,” *European Stars and Stripes*, July 28, 2004.

concepts of operations, they could argue, could reduce readiness and disrupt institutional relationships in the military at a time when U.S. forces are maintaining a high tempo of operations and face lethal threats from insurgent forces. Attempting transformation now, they could argue, would be like trying to change horses in the middle of a river crossing. The risks of attempting transformation under current circumstances, they could argue, would be compounded by the uncertain effectiveness of the new and somewhat experimental capabilities being contemplated under transformation.

Comparative Costs. Transformation supporters argue that even if routine modernization of current capabilities can meet emerging asymmetric security challenges and preserve U.S. conventional superiority, transformation can achieve these goals at less expense over the long run, because it will more fully exploit the warfighting benefits of new technologies than routine modernization can, as well as facilitate the review and elimination of expensive but unneeded legacy forces.

Skeptics could argue that the costs of transformation, both in the near term and long term, are uncertain, and that transformation therefore might not necessarily be less expensive than routine modernization. They could also argue that transformation could turn out to be very expensive if the nature of the transformation undertaken turns out to be incorrect and another set of changes is needed to correct the mistake.

If So, Is The Administration's Plan Appropriate?

If transformation is judged to be necessary or desirable, a potential follow-on oversight question for Congress is whether the Administration's plan for defense transformation is appropriate in terms of the proposed direction of change and the proposed strategy for implementing changes. Each of these issues is discussed below.

Proposed Direction Of Change. Current U.S. military forces could be transformed in a number of ways. Is the Administration's plan for transformation appropriate in terms of how it would change the force? Discussion on this question has developed on a number of elements in the Administration's plan, including those presented below.

Network-Centric Warfare. Some observers argue that the Administration's transformation plan places too much emphasis on the concept of network-centric warfare. The Administration's plan, they argue, overestimates the potential benefits of NCW and underestimates its potential risks. The ability of NCW to overcome uncertainty and confusion on the battlefield — the fog of war — may not be as great as advocates of the Administration's plan make it out to be, they argue, particularly when operating in certain environments, such as urban areas. The Administration's planned emphasis on NCW, they also argue, could make U.S. forces excessively vulnerable to electronic jamming and cyberwar attacks aimed at disrupting the computers and data links that form the network. Such attacks, if successful, could

degrade or even bring down the network, they argue, isolating individual U.S. military units and leaving them potentially vulnerable to destruction.²⁹

Supporters of the Administration's plan argue that DOD is aware that the benefits of NCW can vary depending on the type of operation in question and the environment in which it is being conducted. They also argue that the threat of jamming and cyberwar attacks is fully recognized and is being taken into account in designing and acquiring the C4ISR equipment associated with NCW.³⁰

Total Size Of Force. Some observers believe that the Administration's transformation plan calls for a force that is too small to meet the various demands being placed on it, and that the size of the force, and particularly the Army, needs to be increased to reduce the strain being placed on individual soldiers. Several Members of Congress and other observers have expressed support for increasing the size of the Army by 30,000 or more soldiers, and for increasing the size of the Air Force and Marine Corps as well.

Until late-January 2004, DOD and supporters of the Administration's transformation plan argued that the current high level of demands being placed on U.S. forces is transitory, that transformation (including changes in technology and organization) will permit some missions to be performed with fewer troops that are required today, and that transformation-related efficiency measures — such as transferring to civilian workers tens of thousands of non-combat jobs now being performed by uniformed personnel — will enable U.S. forces to meet those demands without need for additional troops. In January 2004, however, DOD officials indicated that they were open to the idea of increasing the size of the Army by 30,000

²⁹ See, for example, David Hughes, "New Orthodoxy' Under Fire," *Aviation Week & Space Technology*, Sept. 29, 2003, p. 57; Nick Jonson, "Exec: DOD Should Re-Examine Net-Centric Assumptions," *Aerospace Daily*, Nov. 21, 2003; David A. Fulghum and Douglas Barrie, "Cracks In The Net," *Aviation Week & Space Technology*, June 30, 2003, p. 52; David A. Fulghum, "Embracing The Foe," *Aviation Week & Space Technology*, June 30, 2003, p. 54; Loren B. Thompson, "The Hidden Dangers Of Networked Warfare," Lexington Institute, Issue Brief, June 17, 2003; Michael Schrage, *Perfect Information and Perverse Incentives: Costs and Consequences of Transformation and Transparency*, MIT Center for International Studies, Security Studies Program, SSP Working Paper, May 2003; Milan Vego, "Net-Centric Is Not Decisive," *U.S. Naval Institute Proceedings*, Jan. 2003, pp. 52-57; Loren B. Thompson, "The Limits Of Transformation," *Defense Week*, Apr. 22, 2002, p. 1; Thomas P. M. Barnett, "The Seven Deadly Sins of Network-Centric Warfare," *U.S. Naval Institute Proceedings*, Jan. 1999, pp. 36-39.

³⁰ For more on the debate on NCW, see CRS Report RL32411, *Network Centric Warfare: Background and Oversight Issues for Congress*, by Clay Wilson.

for a period of as much as four or five years.³¹ For further discussion of this issue, see CRS Report RS21754.³²

Air Power vs. Ground Forces. In a related debate, some observers argue that the Administration's transformation plan places too much emphasis on air power and not enough emphasis on ground forces. They believe the Administration, at least initially, was interested in reducing the size of the active-duty Army by about two divisions (i.e., to 8 divisions from 10) as part of its transformation plans. These observers objected to this idea, arguing that it reflected an overestimation of the ability of air power to accomplish certain missions in the absence of supporting ground forces, a correspondingly inadequate appreciation for the value of large numbers of ground troops for accomplishing certain missions (such as occupying territory and conducting post-war stability operations), and an inadequate appreciation of the high operational tempo being maintained by the Army. They argue that not all future wars will be amenable to campaigns built primarily around air power, and that the Administration's planned emphasis on air power could make U.S. operations vulnerable to failure should adversaries find a way to counter the targeting systems on which air-delivered weapons rely.³³ They also argue that skilled infantrymen are important for countering certain asymmetric challenges, such as insurgencies, and that reductions in infantry forces consequently should not be used to finance the procurement of aircraft and air-delivered weapons.

Supporters of the Administration's transformation plans argue that the Administration's transformation plan fully recognizes the value of ground forces for certain operations, that the Army's plan to reorganize itself into a force built around brigade-sized units will increase the number of deployable units for meeting worldwide demands, and that transformation aims at exploiting NCW and precision weapons to achieve efficiencies where possible in the numbers of deployed ground troops needed to conduct certain operations. Supporters of the Administration's plan argue that it aims at producing military forces with a wide array of capabilities, of which attacking targets with air-delivered precision-guided weapons is only one, precisely so that the United States will be able to fight various kinds of conflicts in the future. Supporters also argue that operations in Afghanistan and Iraq show the ability of ground forces to rely on air power when the two are effectively integrated.

³¹ See, for example, Donald H. Rumsfeld, "New Model Army," *Wall Street Journal*, Feb. 3, 2004; Joseph C. Anselmo, "Pentagon Plans for Bigger, Better Army With 'Spike,'" *Congressional Quarterly Weekly*, Jan. 31, 2004, p. 270; Vernon Loeb, "Army Expansion Could Last 5 Years," *Washington Post*, Jan. 30, 2004, p. 19; Bradley Graham, "30,000 More Soldiers Approved By Rumsfeld," *Washington Post*, Jan. 29, 2004, p. 1.

³² CRS Report RS21754, *Military Forces: What is the Appropriate Size for the United States?* by Edward F. Bruner.

³³ See, for example, Tom Donnelly and Vance Serchuk, "Preparing To Fight The Next War," *Weekly Standard*, Dec. 1, 2003; Frederick W. Kagan, "The Art of War," *New Criterion*, Nov. 2003 and Mackubin Thomas Owens, "Transforming Transformation," *NationalReviewOnline*, April 23, 2003, [<http://www.nationalreview.com/owens/owens042303.asp>]; Thomas Owens Mackubin, "Reshaping Tilted Against The Army?," *Washington Times*, Nov. 24, 2002, p. B3.

Heavy vs. Medium-Weight Army Forces. Somewhat independent of the debate over the balance of air power and ground forces, some observers have objected to the Administration’s plan to reorganize the Army into modular, brigade-sized Units of Action (UA) because the plan would de-emphasize heavily-armored UAs built around M1 tanks and M2 Bradley Fighting Vehicles in favor of newly created, more mobile “medium-weight” UAs built around the Stryker wheeled combat vehicle. They have argued that medium-weight units will be less lethal and less survivable than heavy formations, and that the greater mobility of these forces will simply permit them to be more easily deployed into situations where they will be defeated by enemy forces.

Supporters of the Administration’s transformation plans argue that heavily armored units, though survivable and lethal, are not very mobile, and therefore are of little or no value in situations requiring the rapid deployment of meaningful ground combat capability. The planned medium-weight units, they argue, will exploit superior battlespace awareness to help achieve sufficient survivability, and will employ new weapon technologies to achieve sufficient lethality.³⁴

Tactical Aircraft vs. UAVs/UCAVs And Long-Range Bombers. Some observers argue that the Administration’s transformation plan places too much emphasis on shorter-ranged tactical aircraft — the Air Force F/A-22 Raptor, the Navy F/A-18E/F Super Hornet, and the multiservice F-35 Joint Strike Fighter (JSF) — and not enough emphasis on unmanned air vehicles (UAVs), unmanned combat air vehicles (or UCAVs, which are UAVs armed with weapons), and long-range bombers. The Administration’s plan — which proposes acquiring thousands of new tactical aircraft while envisaging relatively small numbers of UAVs and UCAVs and maintaining a relatively small bomber force — is inappropriate given uncertain future access to in-theater land bases needed for tactical aircraft (as demonstrated in Afghanistan), the capabilities of UAVs and UCAVs (as demonstrated in Afghanistan and Iraq), the age of the bomber force, the ability of bombers to operate without access to in-theater bases, and the ability of bombers to deliver large numbers of precision-guided weapons in a single sortie.

The Administration has generally argued that its proposed numbers of new tactical aircraft are needed to preserve conventional U.S. military superiority (even when supplemented by UAVs and UCAVs), that UAVs and UCAVs will eventually be procured in significant numbers, and that the current bomber force, though aging, is quite capable (as demonstrated in Afghanistan and Iraq) and will continue to be sufficient, with routine maintenance and modernization, for many years, in part precisely because each plane can carry so many precision-guided weapons.³⁵

³⁴ The deployment to Iraq of units equipped with the Stryker vehicle may provide a test case for arguments concerning the merits of medium-weight forces. Strykers deployed to Iraq were fitted with add-on armor to defeat rocket-propelled grenades being used by insurgent forces.

³⁵ For general discussion on the tradeoff between tactical aircraft, UAVs/UCAVs, and long-range bombers, see CRS Report RL31872, *Unmanned Aerial Vehicles: Background and Issues for Congress*, and CRS Report RL31544, *Long-Range Bombers: Background and* (continued...)

Special Operations Forces. Some observers, while acknowledging the effectiveness of special operations forces in Afghanistan and Iraq, and in counterterrorism operations elsewhere, are concerned that the Administration's plan places too much emphasis on special operations forces as a perceived potential solution to a wide array of security problems. This, they argue, could lead to the use of special operations forces for addressing security problems that might be better addressed through other measures; to the overuse of special operations forces, which could fatigue them and prevent them from conducting adequate training; or to underinvestment in alternative approaches for addressing certain security problems. The current high operational tempo of special operations forces, they argue, can be viewed as evidence that they are now being overused.

Supporters of the Administration's plan, while acknowledging that special operations forces are currently heavily committed around the world, argue that the Administration's planned expansion of special operations forces will eventually permit a reduction in operational tempo for individual units. They also argue that, prior to Afghanistan and Iraq, the capabilities of special operations forces, and their cost-effectiveness in terms of achieving disproportionately large effects on the conventional battlefield and in counterterrorism operations, was underappreciated. Current concerns about an excessive reliance on special operations forces, they argue, are simply reflections of this older and now outdated view.³⁶

Forces for Stability Operations. Some observers, particularly since the onset of the U.S.-led stability operation in Iraq, have argued that the Administration's transformation plan pays too little attention to the demands that stability operations place on the military. Some of these observers have argued in favor of altering the Administration's plan to include the creation of units that are organized and trained specifically for conducting such operations. Other observers, while not advocating the creation of dedicated forces for stability operations, have argued in favor of giving U.S. combat forces more training in such operations, so that they can more easily shift into such operations when required. Administration officials have responded by indicating that they are examining various options for improving the ability of U.S. forces to conduct stability operations.³⁷

Reserve Forces. DOD officials, as part of their more recent thinking on transformation, have mentioned the idea of transferring to active-duty forces parts of certain functions that are now carried out by reserve forces. Supporters of this idea argue that this will permit DOD to deploy forces overseas for contingency operations with less disruption to the daily life of communities around the country where reservists live and work.

³⁵ (...continued)

Issues for Congress, both by Christopher Bolkcom.

³⁶ For more on special operations forces, see CRS Report RS21048, *U.S. Special Operations Forces (SOF): Background and Issues for Congress*, by Andrew Feickert.

³⁷ For more discussion on forces for stability operations, see CRS Issue Brief IB94040, *Peacekeeping and Related Stability Operations: Issues of U.S. Military Involvement*, by Nina M. Serafino and CRS Report RL32321, *Policing in Peacekeeping and Related Stability Operations: Problems and Proposed Solutions*, by Nina M. Serafino.

Opponents argue that the current division of functions between the active and reserve forces, which dates to the years immediately following the Vietnam war, was designed precisely so that large-scale commitments of U.S. forces overseas would require the activation of significant numbers of reserve personnel. Shifting to the active forces functions now carried out by reserve units, these opponents argue, would undermine this arrangement, which is intended to encourage people in affected communities to contact their representatives in Congress and thereby help ensure that elected officials in Washington consider such commitments carefully before approving them.³⁸

Missile Defense. Some observers criticize the Administration's transformation plan for placing too much emphasis on missile defense programs at the expense of other defense-spending priorities. They argue that the Administration has overstated the urgency of the ballistic missile threat at the expense of other potential threats, such as cruise missiles, that the Administration is rushing to deploy missile defenses without first adequately testing them, and that the Administration is wasting limited resources by unnecessarily rushing to deploy systems with limited capabilities that will soon be replaced by more capable versions.

Supporters of the Administration's plan argue that the Administration has correctly assessed the urgency of the ballistic missile threat, that adequate attention is being paid to other potential threats such as cruise missiles, that testing of missile defense systems will continue while early versions are fielded, and that the early versions fielded will have some capability to stop enemy ballistic missiles and will consequently help deter other countries from launching ballistic missile attacks by complicating their calculations regarding the potential for such attacks to succeed.³⁹

Effects-based Operations. Some observers, while acknowledging the potential value of effects-based operations, argue that the concept is currently not that well defined, and that until it is better defined and its potential value consequently better understood, it should not be featured as a key element in the Administration's transformation plan. Other observers argue that the Administration's emphasis on effects-based operations overlooks the potential advantages of attrition-style warfare. Attrition warfare, they argue, leads to the assured destruction of enemy military forces in the field, while effects-based operations, by bypassing certain enemy forces, can permit those forces to blend back into the population at large and prepare for a post-war insurgency campaign that U.S. forces might find more difficult and costly to counter. They further argue that effects-based operations may bring about the collapse of an enemy regime so quickly, and with so little effect on the country's population at large, that the population may not feel that it has been subdued or defeated, possibly making them defiant and more willing to support such an insurgency.⁴⁰

³⁸ See, for example, Janine Davidson, "A Citizen Check On War," *Washington Post*, Nov. 16, 2003, p. B7.

³⁹ For more on missile defense, see CRS Report RL31111, *Missile Defense: The Current Debate*, coordinated by Steven A. Hildreth.

⁴⁰ See, for example, "Collateral Damage," *Aviation Week & Space Technology*, Jan. 26, (continued...)

Supporters of the Administration's plan argue that the concept of effects-based operations is well on its way to being defined, that it is undergoing further intensive development at U.S. Joint Forces Command and elsewhere, and that the value of effects-based operations has already been demonstrated in Kosovo, Afghanistan, and Iraq. They also argue that the potential consequences of attrition warfare (including those caused by large numbers of civilian deaths and large amounts of damage to non-military buildings and infrastructure) have become politically untenable, and that no attrition-style campaign could be so complete as to prevent the subsequent emergence of an insurgency conducted by a relatively small number of opponents who survived the period of major combat. Supporters of the Administration's plan can argue that even if effects-based operations might make post-conflict stability operations more challenging, this is not an argument against using effects-based operations to fight conflicts, but rather an argument for having better capabilities for conducting post-conflict stability operations.

Asymmetric Threats. Some observers are concerned that the Administration's transformation plan, by increasing current U.S. capabilities for conventional warfare, could paradoxically produce undesired results by encouraging potential adversaries to abandon conventional military competition — an area where the United States can compete effectively — and put more of their energies into developing asymmetric responses that will be more difficult for the United States to counter, such as terrorism, nuclear weapons, and cyberwar attacks against civilian computer systems important to the functioning of the U.S. and world economy.⁴¹ Rather than working to discourage potential adversaries from competing against the United States in conventional capability, they argue, the United States should seek to maintain conventional forces that are superior to those of potential adversaries, but

⁴⁰ (...continued)

2004, p. 21; "The Message," *Defense Daily*, Jan. 26, 2004; and James Kitfield, "About-Face," *National Journal*, Jan. 31, 2004, which states that "... relatively little analysis has been conducted of the difficult aftermath in Iraq and whether the war-fighting model actually contributed to many of the post-conflict difficulties." The article states at a later point that

a recent study by the National Defense University strongly suggests that the Pentagon's new war-fighting model fails to adequately take into account the manpower-intensive work of cleaning up in the aftermath of regime-changing wars. "Successes in Afghanistan and Iraq demonstrate that the new war-fighting model is very successful in the first, high-intensity phase of conflict, but there are unintended consequences," said Hans Binnendijk, director of the university's Center for Technology and National Security Policy, which helped to produce the report. "In both instances, we deployed relatively small forces very rapidly, and they won quickly and in very dominant fashion with minimal collateral damage. The result is, you end up in theater with far fewer troops than in traditional wars, [and with] an enemy that is defeated but not exhausted. And suddenly you are in a postwar period without adequate forces or planning for the next phase of nation building."

⁴¹ For more on cyberwar attacks, see CRS Report RL32114, *Computer Attack and Cyber Terrorism: Vulnerabilities and Policy Issues for Congress*, by Clay Wilson.

not so superior that they drive potential adversaries away from spending resources on conventional competition.

Other observers, conversely, are concerned that the Administration's transformation plan places too much emphasis on countering asymmetric threats such as terrorism, and not enough emphasis on preparing for future conventional military challenges 10 or 20 years from now from a potential major regional peer competitor, such as China.

Supporters of the Administration's plan could argue that potential adversaries are already pursuing asymmetric responses to U.S. military capabilities. Increasing the current U.S. superiority in conventional warfare, they could argue, will not change this, but it will permit U.S. forces to conduct successful conventional operations more quickly, with fewer lives lost, and at lower cost. Supporters also argue that the Administration's transformation plan pays adequate planning attention to the possibility of a conventional military challenge 10 or 20 years from now from a major regional peer competitor such as China.

Afghanistan And Iraq War As Test Cases. Since the merits of the Administration's proposed direction of change under its transformation plan are the subject of debate, many observers have focused on recent U.S. military operations in Afghanistan and Iraq as potential test cases for validating or disproving various aspects of that plan. Operations in Afghanistan were viewed by many observers as highlighting the potential capabilities of special operations forces, particularly when operating in conjunction with aircraft armed with precision-guided weapons, and of UAVs and UCAVs. Operations in Iraq have been debated in terms of whether they validate the Administration's overall transformation vision, and in terms of specific issue areas such as NCW, Army forces, and special operations forces. For extended discussions on these topics, see CRS Report RL31946, *Iraq War: Defense Program Implications for Congress*.⁴²

Proposed Strategy For Implementing Transformation. Is the Administration's plan for transformation appropriate in terms of its proposed implementation strategy? Potential areas of discussion on this issue include those presented below.

Overall Leadership and Management of Transformation. A December 2004 report from the Government Accountability Office on DOD's transformation efforts states:

DOD has taken positive steps to design and implement a complex strategy to transform U.S. military capabilities, but it has not established clear leadership and accountability or fully adopted results-oriented management tools to help guide and successfully implement this approach. The responsibility for transforming military capabilities is currently spread among various DOD organizations, with no one person or entity having the overarching and ongoing leadership responsibilities or the accountability for achieving transformation

⁴² CRS Report RL31946, *Iraq War: Defense Program Implications for Congress*, coordinated by Ronald O'Rourke.

results. In addition, although DOD established an informal crosscutting group that meets occasionally to discuss transformation issues, this group has no charter, formal responsibilities, or authority to direct changes. GAO has previously reported that key practices for successful transformation include leadership that sets the direction of transformation and assigns accountability for results, and the use of crosscutting implementation teams, which can provide the day-to-day management needed for success. In recent testimony on DOD's business transformation, we underscored the importance of these elements and stated that DOD has not routinely assigned accountability for performance to specific organizations or individuals who have sufficient authority to accomplish goals. DOD officials believe that a single organization accountable for transformation results and a formal implementation team are not necessary because existing informal mechanisms involve key organizations that can individually implement needed changes, and an annual assessment of transformation roadmaps is prepared for the Secretary of Defense, who can direct the transformation efforts of each organization. However, in the absence of clear leadership, accountability, and a formal implementation mechanism, DOD may have difficulty resolving differences among competing priorities, directing resources to the highest priorities, and ensuring progress should changes in senior personnel occur. In addition, informal mechanisms are not sufficient to provide transparency to the process or assurance to Congress that DOD is allocating resources to address needed improvements rather than desired improvements.

While DOD's strategy to transform military capabilities is a good first step, DOD has not fully developed results-oriented management tools that can help managers effectively implement and manage major efforts, and focus on achieving results. Specifically, DOD has not revised its initial transformation goals, set in 2001, to reflect new joint concepts — thus, DOD lacks a foundation for developing other tools such as performance goals and measures and linking specific resources needed to achieve each goal. DOD faces challenges in developing these tools because the joint concepts are being developed concurrently with its plans to acquire new capabilities. But without these results-oriented tools, it will be difficult for DOD to determine the extent to which its transformation efforts are achieving desired results, to measure its overall progress, or to provide transparency for how billions of dollars in planned investments are being applied.⁴³

Funding For Transformation vs. Near-Term Priorities. Some observers argue that the Administration's plan for implementing transformation provides too much funding for longer-term transformation goals and not enough funding for near-term needs. They have argued, for example, that the Administration's plan provides significant funding for development of next-generation Army combat vehicles, but inadequate funding for modernization of current Army M1 tanks and M2 Bradley fighting vehicles. They also argue that the Administration has not adequately funded certain near-term Army readiness needs, such as ceramic body armor, Humvees with improved armor, and helicopter survivability equipment.

⁴³ U.S. Government Accountability Office. *Military Transformation[:] Clear Leadership, Accountability, and Management Tools Are Needed to Enhance DOD's Efforts to Transform Military Capabilities*, GAO-05-70, December 2004.

Other observers argue, conversely, that the Administration's plan, though nominally supportive of transformation, provides too much funding for legacy systems and not enough funding for transformation-related programs. They argue, for example, that even if one agrees with the relative emphasis in the Administration's transformation plan on tactical aircraft vs. UAVs/UCAVs and long-range bombers, the Administration's plan includes excessive amounts of funding for procurement of tactical aircraft while underfunding development of UAVs and UCAVs.

Supporters of the Administration's plan argue that it strikes the right balance between funding for legacy systems vs. transformation-related programs. They can argue that tactical aircraft like the F/A-22 and the STOVL (short takeoff, vertical landing) version of the JSF can be considered transformational, and that the Administration's plan includes actions aimed at ensuring that all tactical aircraft are procured in an economical fashion. Spending on UAVs and UCAVs, they argue, will increase substantially when UAVs and UCAVs now in development emerge from the development process and start to be procured in larger numbers. Legacy systems, supporters argue, should be modernized only if not doing so would create unacceptable operational risks, and that if instances are discovered where inadequate funding for modernization of legacy equipment creates unacceptable operational risks, additional funding can be moved into those areas to address the shortfall.

Office of Force Transformation. Potential questions for Congress regarding the role of OFT in implementing transformation include the following:

- Does OFT have too much, not enough, or about the right amount of authority, staffing, and funding to carry out its responsibilities in promoting transformation and overseeing the transformation efforts of the various services and DOD agencies?⁴⁴
- What are the potential advantages and disadvantages of giving OFT authority to allocate larger amounts of funding for use in transformation-related research, development, and exercises?
- Is OFT exercising too much, not enough, or about the right amount of control over the content of the transformation road maps submitted by the individual services and agencies? Are OFT's efforts to ensure compatibility and commonality among the service's transformation road maps reducing the potential benefits that can come from allowing service-unique perspectives to be articulated?
- How good a job is OFT doing in explaining and garnering support for the general concept of transformation, and for specific transformation ideas?⁴⁵

⁴⁴ For an earlier discussion of this issue, see Amy Svitak, "Clear Role Eludes U.S. Transformation Office," *Defense News*, Sept. 23-29, 2002, pp. 22.

⁴⁵ For discussions of this issue, see Thomas E. Rocks and Josh White, *Scope Of Change In* (continued...)

- To what degree is OFT's current concept of transformation a product of the thinking of its current director, retired Navy vice admiral Arthur Cebrowski, and how might OFT's approach toward transformation change when Cebrowski is succeeded by another person?
- In light of the responsibilities and potential influence of OFT, should the position of Director of OFT be made a Senate-confirmable position?

U.S. Joint Forces Command. Potential questions for Congress regarding the role of USJFCOM in implementing transformation are similar to those above regarding OFT:

- Does USJFCOM have too much, not enough, or about the right amount of authority, staffing, and funding to carry out its responsibilities in developing joint doctrine for transformation and in managing joint exercises for testing transformation ideas?
- How good a job is USJFCOM doing in developing joint doctrine to be used by the services in developing compatible transformation road maps?
- What are the potential advantages and disadvantages of giving USJFCOM authority to allocate larger amounts of funding not simply for transformation-related research, development, and exercises, but for procurement of transformation-related equipment to be used by operational forces?⁴⁶
- Is DOD requesting adequate funding for operating and expanding the Joint National Training Capability (JNTC) that is to be used by USJFCOM for conducting joint exercises?⁴⁷

⁴⁵ (...continued)

Military Is Ambiguous," *Washington Post*, August 1, 2004: 6; and Keith J. Costa, "Cebrowski Cites Progress In Work To Transform The Pentagon," *Inside the Pentagon*, August 5, 2004.

⁴⁶ The FY2004 defense authorization bill provides authority for USJFCOM to spend up to \$50 million dollars on procurement of equipment for battle management command, control, communications, and intelligence, or for equipment that facilitates the use of joint forces in military operations or enhances the interoperability of equipment used by elements of the joint force. For an article discussing this, see Anne Plummer, "Congress Gives JFCOM Limited Budget To Develop Joint C2 Systems," *Defense Information & Electronics Report*, Nov. 21, 2003; See also David Hughes, "The Future Of Joint Warfighting," *Aviation Week & Space Technology*, May 26, 2003, p. 76; and Keith J. Costa, "Joint National Training Capability: The Next Wave In Transformation," *Inside the Pentagon*, Feb. 20, 2003, p. 1.

⁴⁷ Using funds authorized in FY2004, DOD plans to open the JNTC in October 2004. For FY2005, DOD is requesting \$191 million to continue and expand the JNTC in FY2005. For (continued...)

- Do USJFCOM's dual roles as a provider of joint forces and as DOD's premier transformation laboratory conflict with one another, and if so, what are the options for resolving the conflict?
- Are the transformation-related activities of OFT and USJFCOM sufficiently coordinated?

Transformation “Pots of Money.” As a means of promoting innovation and the implementation of transformational ideas, some DOD officials and other observers have occasionally proposed establishing one or more special funds within the Pentagon budget — special “pots of money” — that would be allocated on a competitive basis to groups with proposals for furthering transformation.⁴⁸ Potential questions for Congress concerning this idea include the following:

- How many such pots of money have been established within the DOD budget? Where in the DOD budget are they located? How much funding do they contain, and is this amount too much, not enough, or about right?
- Who decides how to award the funding, and what criteria are used to make award decisions? Are projects funded through these pots of money adequately justified? Is funding being used to promote any ideas that, if realized, might challenge aspects of current transformation plans?
- What are the results to date of projects that have been partly or wholly financed through these pots of money? What alterations have they prompted in transformation plans?

Experiments And Exercises. Some observers have expressed concern about whether experiments and exercises carried out nominally in support of transformation are sufficiently focused on exploring transformational warfighting ideas as opposed to demonstrating existing non-transformational capabilities. Observers have also expressed concerned about whether experiments and exercises are sufficiently challenging and realistic, and whether they are “scripted” to ensure

⁴⁷ (...continued)

more on the JNTC, see “Joint National Training Capability: The Next Wave In Transformation,” op cit; Kim Burger, “US Forces To Get More Realistic Joint Exercises,” *Jane's Defense Weekly*, Dec. 11, 2002; Marc Strass, “Giambastiani: Joint National Training Center Needed For Service Training,” *Defense Daily*, July 29, 2002, p. 6.

⁴⁸ See, for example, Elaine M. Grossman, “Rumsfeld Team Wants To Create Own Funding Pot For ‘Transformation,’” *Inside the Pentagon*, Mar. 28, 2002, p. 1.

the success of favored transformation ideas.⁴⁹ Potential questions for Congress regarding transformation-related tests and exercises include the following:

- Does the Administration's plan include too many, not enough, or about the right amount of transformation-related experiments and exercises?
- Are these experiments and exercises adequately funded to fulfill their stated objectives?
- Are they oriented toward examining transformational ideas, or are they oriented toward demonstrating existing or incrementally improved capabilities?
- Are they sufficiently challenging and realistic? Do they allow for failures from which lessons can be learned, or are they scripted to ensure the success of transformation ideas that are already believed to be true?
- How, if at all, have lessons from these experiments and exercises to date affected DOD's transformation plan?

Metrics for Transformation. Advocates of transformation argue that new metrics (i.e., methods of measurement or measures of effectiveness) will be needed to accurately measure the capabilities of transformed military forces and the effectiveness of transformational military systems, organizational changes, and concepts of operation. Traditional methods for measuring military power, such as

⁴⁹ Some observers, for example, expressed concern that USJFCOM's large Millennium Challenge 2002 exercise may have been scripted to ensure the success of favored DOD transformation ideas. See Richard Hart Sinnreich, "Cooking The Books Won't Help The Military Transform," *Lawton (OK) Constitution*, Aug. 18, 2002, p. 4; Dale Eisman, "Pentagon Leaders Defend War Game," *Norfolk Virginian-Pilot*, Aug. 21, 2002; Michael Gilbert, "General: Stryker Unit's Performance Not At Issue," *Tacoma New Tribune*, Aug. 22, 2002; Dennis O'Brien, "Controversial War Game Improved Warriors," *Norfolk Virginian-Pilot*, Aug. 23, 2002; Sean D. Naylor, "Fixed War Game?," *Army Times*, Aug. 26, 2002, p. 8; Jason Ma, "In Simulation, Navy Suffers Heavy Losses, Including Aircraft Carrier," *Inside the Navy*, Aug. 26, 2002: 1; Mackubin Thomas Owens, "Let's Not Rig Our War Games," *Wall Street Journal*, Aug. 29, 2002; William F. Kernan, "Joint War Games," *Army Times*, Sept. 16, 2002, p. 52 (letter to the editor); Bradley Graham, "Criticism Of War Game Rejected," *Washington Post*, Sept. 18, 2002, p. 27; Elaine M. Grossman, "Generals Take Stock Of U.S. Vulnerability To Common Technologies," *Inside the Pentagon*, Sept. 19, 2002; Michael Schrage, "Military Overkill Defeats Virtual War," *Washington Post*, Sept. 22, 2002, p. B5; Lionel Van Deerlin, "Taking Their Warships And Going Home," *San Diego Union-Tribune*, Nov. 6, 2002; and Jeff Huber, "Invasion of the Transformers," *U.S. Naval Institute Proceedings*, Oct. 2003, pp. 74-76, particularly the section entitled "New Dogs, Old Tricks."

See also Loren B. Thompson, "Revolution Gone Awry[:] How Transformation May Undermine Military Preparedness," Remarks Before the Council on Foreign Relations Security Roundtable, Nov. 18, 2002 and Keith J. Costa, "Konetzni: Transformation In Need Of 'Solid Intellectual Analysis,'" *Inside the Pentagon*, May 22, 2003.

the total number of divisions, air wings, and ships, they argue, will need to be replaced by more sophisticated measures that take into account not only the raw numbers of platforms or units in a military force, but also the effect of NCW, EBO, and other new technologies and ideas in increasing the overall effectiveness of a force that includes a certain number of such platforms. Similarly, they argue that in assessing the effectiveness of proposed transformational weapon systems, traditional performance measures, such as platform speed and range, will need to be supplemented or replaced by new measures that take into account factors such as the system's ability to operate in a network environment so as to contribute to, and take advantage of, targeting and other information distributed over the network. Potential questions for Congress include the following:

- To what degree has DOD developed new metrics for measuring the capabilities of transformed military forces and the effectiveness of transformational military systems? To what degree is DOD using these new metrics in making decisions about programs and resources? When will the process of developing and applying new metrics be complete?
- Who is involved in developing the new metrics, and what process is being used to develop them?
- Are DOD's emerging new metrics unduly biased against legacy forces? Are they unduly biased in favor of its own transformation proposals vs. transformation proposals offered by others?

Independent Analysis. Some observers have expressed concern that there has been relatively little formal analysis or review by specialists independent of DOD of the merits of the Administration's proposals for transformation. One article, for example, states:

There's at least one potential drawback to all of this "transformation": It has been subjected to remarkably little outside scrutiny or independent analysis....

Indeed, without rigorous congressional oversight or a thorough analysis of the risks-versus-rewards trade-offs of transformation, experts worry that the rapid and profound changes now under way could lead to unpleasant and unintended surprises. As Pentagon officials have rewritten U.S. strategic war plans, they have touted the success of the three-week Iraqi Freedom campaign. But relatively little analysis has been conducted of the difficult aftermath in Iraq and whether the war-fighting model actually contributed to many of the post-conflict difficulties. Many military experts also caution that the Iraqi army was too weak an opponent on which to base such fundamental reforms....

Even some transformation advocates question whether Rumsfeld's plans have enough checks and balances in place. The transformation umbrella is casting an ever-greater shadow over a growing host of initiatives, for instance, that have not seen the light of independent scrutiny. "Without independent analysis, we may never know the true lessons of the Iraq war," Krepinevich said. Clear troubles that arose with that campaign, such as problems with logistics and supply, have

not been studied adequately, he says. “Basically, the Pentagon and U.S. military are grading their own homework.”⁵⁰

⁵⁰ James Kitfield, “About-Face,” *National Journal*, Jan. 31, 2004. Another analyst has stated that

the Bush Administration is in too much of a hurry to wait for the results of empirical inquiry, and is making bets largely on the basis of bias. Once we depart from rigorous standards of analysis, we begin to subvert the process that made transformation possible in the first place.

(Loren B. Thompson, “Revolution Gone Awry[:] How “Transformation May Undermine Military Preparedness,” Remarks Before the Council on Foreign Relations Security Roundtable, Nov. 18, 2002.)

An article discussing the Millennium Challenge 2002 exercise states:

The future effectiveness of such simulations will also depend on more independent review of the experiments being run. The same Joint Forces Command that designed Millennium Challenge 2002 gets to analyze its effectiveness. That’s an intolerable conflict. Qualified civilians and retired officers of all ranks should instead be brought in as “independent directors” to help define the distinction between experiments designed to validate concepts and games designed to generate victors on virtual battlefields. The surest way to make the next Millennium Challenge more valuable would be to have more Van Rippers assess these games as well as play them.

(Michael Schrage, “Military Overkill Defeats Virtual War,” *Washington Post*, Sept. 22, 2002, p. B5.)

Another article reported:

Technology innovation should not be pursued for its own sake in the name of defense transformation, according to Vice Adm. Albert Konetzni, the deputy commander and chief of staff for the Atlantic Fleet. Rather, decisions on how to harness the nation’s capacity for innovation should be based on “solid intellectual underpinnings,” to include mathematical analysis, and experimentation, he said May 13 at a conference here.

“I feel very strongly that we have lost our bearings when it comes to transformation because most of the talk is not backed up by solid intellectual analysis,” states the admiral’s prepared speech for event, sponsored by the Association for Communications, Electronics, Intelligence and Information Systems Professionals. Konetzni also blasted technology development and experimentation across the Navy, singling out four programs for criticism: the Joint Fires Network, Navy-Marine Corps Intranet, mine warfare efforts and the Battle Force Tactical Training (BFFT) system.

“We have a great country, capable of awesome innovation, but military innovation pursued without solid intellectual underpinnings, without a clear vision of how it fits into the overall construct, and without discipline, can lead you down the wrong road,” Konetzni said. “At best, it will be wasteful of [the] nation’s resources. At worst, it can be disastrous for our men and [women] in combat.”

(continued...)

Centralization And Decentralization. A key issue in innovation-related topics like transformation are the potential advantages and disadvantages of organizational centralization and decentralization in generating and implementing innovative ideas, particularly those that involve potentially disruptive change.

Advocates of centralization in DOD's transformation effort could argue that if transformation planning and implementation is too decentralized, it can become confused and unfocused, or too expensive to implement due to an excess of ideas to pursue, or that competing interest groups within DOD could take advantage of the situation to stifle the implementation of promising ideas they find threatening to their own situations.

Advocates of decentralization could argue that if transformation planning and implementation is centralized in the hands of too small a number of key individuals, it could reflect only the personal transformation preferences of those individuals, regardless of their potential value, that promising transformation ideas from others could be dismissed without proper evaluation (particularly if they compete with transformation ideas supported by those key individuals), and that major transformation goals could shift abruptly as those key individuals are succeeded by others.⁵¹

⁵⁰ (...continued)

To illustrate this point, the admiral discussed the rapid development of the Monitor, a Union ironclad ship employed during the Civil War. The Monitor, which fought the Virginia, a Southern ironclad, to a draw, was "clearly the most innovative ship of her day," Konetzni said. Still, the Monitor had its flaws — in particular, inadequate pumps to keep out seawater — because its design and construction were rushed.

The country's experience with the Monitor should teach those pushing new technology today that they need to take a disciplined approach, according to the admiral.

Unfortunately, service officials in recent times "have largely abandoned operations analysis," Konetzni said. "Without looking clearly at the mission and rigorously analyzing the potential of new tactics and technologies to improve warfighting, we just get PowerPoint solutions," he said, adding, "I just can't take seeing another slide with red, yellow, and green blocks for effectiveness with nothing mathematical behind them."

A better path would be one in which proposals for innovation are studied analytically and developed with a "complete plan" — including concept of operations, training and maintenance — "before we throw these things on our ships," he said.

(Keith J. Costa, "Konetzni: Transformation In Need Of 'Solid Intellectual Analysis,'" *Inside the Pentagon*, May 22, 2003.)

⁵¹ See, for example, Loren Thompson, "Transformation, Or Ideology?" *Defense News*, Sept. 23-29, 2002, p. 15, in which the author writes that

it is unsettling to see policy-makers with limited technical credentials making
(continued...)

Potential questions for Congress regarding centralization and decentralization in transformation planning include the following:

- What are the potential advantages and disadvantages of centralization and decentralization in transformation planning?
- Is the Administration's process of transformation planning too centralized among a few key personnel in OSD, not centralized enough, or about right in terms of the number of people who have key roles?

Culture Of Innovation. DOD officials and other observers note that instilling a culture of innovation among DOD personnel will be critical to implementing transformation. Instilling such a culture could involve things such as actions to create an institutional and workplace receptiveness to new ideas, procedures for protecting people who generate new ideas, and avoidance of the so-called “zero-defect” approach for assessing performance and selecting people for advancement.⁵² Potential challenges to creating a culture of innovation include a widespread familiarity and comfort with the status quo, the so-called “not-invented-here”

⁵¹ (...continued)

such bold claims for the transformative power of emerging technology. At its inception during Clinton's first term, transformation was a relatively modest initiative pushed by policy-makers with impressive scientific credentials. Now it is an all-embracing concept pushed by people with a much weaker grasp of relevant technologies.

In other words, transformation has become an ideology.

Third, the internal Pentagon processes shaping transformation exclude many of the players with a stake in the outcome, including those with the greatest operational and technological expertise. Complaints from senior military officers about the practical consequences of decisions frequently are dismissed, and even participants in the secretive inner circle risk being ostracized if they don't show proper fealty to the new paradigm.

Fourth, because key choices are being made in isolation from the organizations that will implement them, there is little likelihood they will survive beyond the tenure of Defense Secretary Donald Rumsfeld. This top-down approach compounds the mismatch between political rhythms and development cycles, resulting in promising programs being killed just as they approach fruition.

Former Navy Secretary John Lehman had adopted such an approach. The rapid purging of proteges and ideas once he left the Pentagon should be a lesson for those who think they can dictate outcomes without eliciting the buy-in of stakeholders.

⁵² Under the “zero-defect” approach, only applicants who have made zero mistakes are selected for promotion, while applicants who have one or more mistakes on their record are ruled out for promotion. Critics of this approach argue that people who have made no mistakes in their careers are also likely to have never tried to accomplish anything that, if successful, would have qualified as a useful innovation.

syndrome,⁵³ a cadre of senior officers who were taught, and have spent their entire careers abiding by, traditional ideas and practices, and the difficulty of quantifying or explaining the potential advantages of proposed innovations.

A recent survey of more than 2,500 U.S. military officers provided mixed evidence on whether those officers believe such a culture is being created.⁵⁴

⁵³ This refers to an inclination to not be interested in ideas that come from outside one's own organization.

⁵⁴ Thomas G. Mahnken and James R. FitzSimonds, *The Limits of Transformation: Officer Attitudes Toward the Revolution in Military Affairs*, Newport Paper #17, (Newport: Naval War College, 2003).

A press report about the survey stated:

Changing the military is key to winning tomorrow's wars, but a majority of officers aren't sure the Pentagon is on the right track to transforming itself, according to a new survey.

And while most Marine and Air Force officers believe their services reward innovation, a minority of Navy and Army officers feel the same way, according to the poll, conducted in 2002 and released this month by two independent researchers.

Likewise, 75 percent of Marine officers polled believe their service culture is open to self-criticism, while fewer than 50 percent of Army, Navy and Air Force officers agree that their services encourage critical discourse.

"It seems to me that most officers have not encountered innovation in their careers, but there are significant service differences," said Thomas G. Mahnken, acting director of the Strategic Studies Program at Johns Hopkins University in Washington. "The Marines clearly see their service as more accepting of innovation than other services."

Mahnken and James R. Fitz-Simonds, a professor at the Naval War College in Newport, R.I., polled a total of more than 2,500 officers from the four services on their views of military transformation and innovation. The officers polled included junior, midgrade and flag officers attending 16 professional military education institutions such as Naval Postgraduate School, the Marine Corps Command and Staff College, or the Army or Air War colleges....

While 75 percent of Marine officers felt the Corps is open to self-criticism, only 39 percent of Navy officers felt the same way about their service. About 48 percent of both Army and Air Force officers agreed. Also, about 58 percent of the Marine officers surveyed said their service rewarded innovation, whereas only 28 percent of Navy officers said the same of their service. About 58 percent of Air Force officers believe their service rewards innovation, but only 34 percent of Army officers say the same.

(Gordon Lubold, "Survey Shows Many Officers Skeptical Of Transformation," *Marine Corps Times*, Nov. 24, 2003, p. 22.) See also Thomas E. Ricks, "A Test Case For Bush's Military Reform Pledge?" *Washington Post*, Feb. 20, 2002, p. 13.

Potential questions for Congress include the following:

- What steps have been taken, or are planned, to promote a culture of innovation among DOD personnel to support transformation?
- What incentives are in place, or will be in place, to reward the generation of innovative ideas? What additional incentives are required?
- What actions have been taken, or will be taken, to ensure that personnel who propose innovative ideas will not be penalized when those ideas are rejected or are disproved in experiments and exercises?
- What provisions does the Administration's approach to transformation have for maintaining and protecting in-house contrarian thinkers — what might be called “members of the loyal opposition” — whose transformation ideas, though rejected or disproved in experiments and exercises, might one day, under different circumstances, prove useful?
- What changes, if any, to officer education and officer career paths are needed to promote a culture of innovation? How many of these changes have been made? Of those that haven't, how many would require legislation to implement?
- What evidence is there that a culture of innovation is taking root? In what ways has the Administration's transformation plan been altered by innovative ideas generated by officers who are not in offices, such as OFT, that are directly responsible for guiding or administering transformation efforts?⁵⁵

Potential Implications for Congressional Oversight of DOD

A third potential issue for Congress concerns the implications of defense transformation for congressional oversight of DOD activities. Potential areas of focus include organizational issues, sufficiency of information and metrics for assessment, oversight of weapons acquisition, the Administration's use of the concept of transformation in justifying its proposals to Congress, and potential Congressional initiatives on transformation.

Committee Organization. The concept of transformation can lead to new ways of examining defense issues. It can, for example, lead to a greater focus on examining issues from a joint rather than service-specific perspective, a greater focus on asymmetric as opposed to conventional military threats, or a greater focus on

⁵⁵ For additional discussion, see Johnson, Edgar M. *Workshop Introducing Innovation and Risk: Implications of Transforming the Culture of DoD*. Washington, 2004, 35 pp. (Institute for Defense Analyses, March 2004)

networks, sensors, and C4ISR equipment rather than individual military platforms such as aircraft, ships, and ground vehicles.

The defense oversight committees in recent years have responded to this situation by making certain changes in organization and activities. The Senate Armed Services Committee, for example, created a new subcommittee on emerging threats and capabilities, while the House Armed Services Committee created a new subcommittee on terrorism, unconventional threats and capabilities. The committees have shifted staff assignments and hired new staff to increase their ability to conduct oversight of transformation-related topics such as C4ISR programs. And the committees have held a number of hearings on transformation and transformation-related topics. A potential question for Congress at this point is whether any further organizational changes are needed to improve the ability of the defense-oversight committees to incorporate the concept of transformation into congressional oversight of DOD activities.

Adequacy of Information and Metrics for Assessment.

Transformation is a broad topic with many elements subject to frequent change and development. In addition, measuring progress in attaining transformation can be a complex undertaking. Transformation thus raises a potential issue as to whether Congress has adequate information and tools for assessing DOD's progress in implementing transformation. Potential questions for Congress on this issue include the following:

- Are the defense budget and related budget-justification documents that are submitted to Congress adequately organized and presented to support the incorporation of the concept of transformation into Congress' review of the budget? If not, in what ways should the organization and content of the budget and the budget-justification documents be changed?
- Does DOD provide Congress with sufficiently detailed and periodic information about the status of DOD transformation efforts to support congressional oversight of these efforts? Should Congress, for example, require DOD to submit periodic reports on the status of transformation in general, or of specific aspects of transformation?
- Does Congress have adequate metrics for measuring military capability in light of transformation-related changes, such as NCW, or for assessing DOD's success in implementing transformation?

Oversight Of Weapons Acquisition. As mentioned earlier, the administration, as part of its efforts in support of transformation, has revised the regulations governing the acquisition of new weapons and systems with the aim of saving money and reducing acquisition cycle time. Key among the changes implemented by DOD is evolutionary acquisition with spiral development (EA/SD), which DOD has identified as its new preferred acquisition strategy.

Although the overall goal of EA/SD — to make the acquisition system more responsive to rapid changes in threats, technology, and warfighter needs — is widely

supported, as discussed in more detail in CRS Report RS21195, EA/SD poses potentially significant issues for congressional oversight, particularly for newly initiated weapon acquisition programs, in three areas:

- **Ambiguous initial program description.** Programs initiated under EA/SD may not be well defined at the outset in terms of system design, quantities to be procured, development and procurement costs, and program schedule. These are key program characteristics that Congress in the past has wanted to understand in some detail before deciding whether to approve the start of a new weapon acquisition program. EA/SD can thus put Congress in the position of deciding whether to approve the start of a new a program with less information than it has had in the past.
- **Lack of well-defined benchmarks.** A corollary to the above is that Congress may not, years later, have well-defined initial program benchmarks against which to measure the performance of the military service managing the program or the contractor.
- **Funding projections potentially more volatile.** Although projections of future funding requirements for weapons acquisition programs are subject to change for various reasons, funding projections for EA/SD programs may be subject to even greater volatility due to each program's inherent potential for repeated refinements in performance requirements or technical approaches. As a result, any long-range projections of future funding requirements for EA/SD programs may be even less reliable than projections for systems pursued under the traditional DOD acquisition approach.

Supporters of EA/SD argue that it can improve congressional oversight of DOD weapon acquisition programs because the information that DOD provides for a given program will focus on the specific part of the program that is proposed for development over the next few years. This information, they argue, will be more reliable — and thus better for Congress to use in conducting its oversight role — than the kind of long-range information that used to be provided under the traditional DOD acquisition approach. Skeptics of EA/SD, however, could argue that it has the potential for drawing Congress into programs to a point where extrication becomes difficult if not impossible, and without a clear idea of a program's ultimate objectives. Skeptics could also argue that a lack of long-term cost and performance projections makes it more difficult to assess potential long-term affordability and cost effectiveness.

Potential questions for Congress and DOD regarding congressional oversight of EA/SD programs include the following:

- What might be the impact on both congressional approval of new weapon acquisition programs and subsequent congressional oversight of those programs, of having limited initial detail in terms

of system design, quantities to be procured, procurement schedules, and total costs?

- How might congressional oversight of weapon development programs be affected if program information with longer time horizons but potentially less reliability is exchanged for program information with potentially greater short-term reliability — but without previously available, if imperfect, estimates of full program costs?
- To what extent might DOD's new preference for EA/SD be influenced, as some critics contend, by the knowledge that it might relieve DOD of the responsibility for providing specific answers to congressional questions regarding system architecture, effectiveness, time lines, long-term strategic implications and cost?

Transformation As All-Purpose Justification Tool. Some observers are concerned that the Administration's regular (some might even say habitual) use of the term transformation in discussing its proposals for DOD has turned the concept of transformation into an empty slogan or buzz-phrase. Other observers are concerned that the Administration is invoking the term transformation as an all-purpose rhetorical tool for justifying its various proposals for DOD, whether they relate to transformation or not, and for encouraging minimal debate on those proposals by tying the concept of transformation to the urgent need to fight the war on terrorism.

Concerns along these lines were heightened by the "Defense Transformation for the 21st Century Act of 2003," a 205-page legislative proposal that the Administration submitted to Congress on April 10, 2003, that would, among other things, permit DOD to establish its own policies for hiring, firing, and compensating its civil service employees; change the terms in office for certain senior generals and admirals; give DOD increased authority to transfer funds between DOD budget accounts; alter laws relating to the protection of marine mammals; and eliminate many DOD reporting requirements that were instituted to assist Congress in conducting oversight of DOD activities.⁵⁶

Potential oversight questions for Congress relating to the Administration's use of transformation in justifying its proposals for DOD include the following:

- Is the Administration debasing the concept of transformation through overuse?

⁵⁶ See, for example, John M. Donnelly, "Hill Rebuffing Rumsfeld Plan To Kill Reports To Congress," *Defense Week Daily Update*, May 15, 2003; John Liang, "House Democrats Object To DoD Transformation Legislation," *InsideDefense.com*, May 14, 2003; William Matthews and Gopal Ratnam, "Transformation Act Draws U.S. Lawmakers' Fire," *DefenseNews*, May 5, 2003, p. 1; and Lawrence Korb, "Pentagon Independence," *DefenseNews*, June 2, 2003, p. 29.

- Is the Administration, in justifying its proposals for DOD, drawing adequate distinctions between proposals that are transformational and proposals that are not transformational but might nevertheless be worthwhile for other reasons?
- Is the Administration using the term transformation in part to cloud potential issues pertaining to its proposals for DOD or to minimize congressional debate on those proposals?
- Is the Administration using the large, complex, and somewhat abstract topic of transformation in part to occupy Congress' attention and thereby distract Congress from conducting detailed oversight on DOD's proposed budgets, or to keep Congress off balance as it attempts to conduct oversight of DOD activities?

Congressional Transformation Initiatives. In addition to responding to DOD proposals for transformation, Congress may consider the option of instituting its transformation initiatives not proposed by DOD. As mentioned in the background section, Congress in the past has initiated changes that can be viewed as transformational that were not originally proposed by DOD. Potential questions for Congress in connection with potential new congressional transformation initiatives include the following:

- Are there any potentially worthy areas of transformation, or ideas or proposals for transformation, that DOD has overlooked or paid too little attention to in its transformation planning?
- Are there any DOD goals for transformation that Congress should consider expanding or accelerating?

Legislative Activity For FY2005

FY2005 Defense Authorization Bill (H.R. 4200/P.L. 108-375)

House. Section 214 of H.R. 4200 as reported by the **House Armed Services Committee** (H.Rept. 108-491 of May 14, 2004) would require funding for research and development work by USJFCOM to be derived solely from the DOD-wide research and development account rather than the research and development accounts of the individual services. Funding for USJFCOM research and development work is currently programmed in the Navy's research and development account. In discussing Section 214, the committee's report states:

The committee believes that, as the Department's executive agent for joint warfighting concept development and experimentation, [USJFCOM's] budget for joint warfare experimentation and related programs should be independent of, and separate from the budgets of the military departments. The committee also notes that the precedent that has been established by the Department in maintaining the budgets for the Joint Staff and defense agencies separate from the budgets of the military departments. The committee also observes that

maintaining the budget for the joint warfare experimentation and transformation programs as a part of budget request for the Navy's science and technology program tends to create a false impression of funding levels for the latter.

The committee directs the transfer of funding for the Joint Forces Command joint experimentation, joint warfare experiments and joint warfare transformation programs from Research, Development, Test, and Evaluation, Navy to Research, Development, Test, and Evaluation, Defense-wide, as follows:

(1) \$167.7 million for Joint Experimentation from Navy PE 32727N to Defense-wide PE 63xx1;

(2) \$26,000 for Joint Warfare Experiments from Navy PE 63757N to Defense-wide PE 63xx2; and

(3) \$22.5 million for Joint Warfare Transformation Programs from Navy PE 64787N to Defense-wide PE 63xx3. (Pages 254-255.)

Section 597 of H.R. 4200 as reported by the House Armed Services Committee would require DOD to submit reports on progress for achieving certain transformation milestones. The committee's report states:

This section would require the Secretary of Defense to provide a number of reports to the Senate Committee on Armed Services and the House Committee on Armed Services on different aspects of transformational efforts underway in the Department. One report would provide information on the efforts to convert military to civilian positions, and a series of annual reports in fiscal years 2005 through 2007 would provide information on the conversion of military positions to other higher priority military positions. The section would also require the Secretary of Defense to examine the feasibility of implementing: (1) a system to embed within the military on a temporary basis persons with civilian skills that are of high value to the military, and (2) a personnel system that expands the capability of the armed forces to rapidly access, from other than the reserve components, civilian volunteers with skills needed by the armed forces. Finally, the section would also require the Secretary of the Army to report annually on the status of efforts to transform the Army from a division-oriented system to a brigade oriented one. (Page 329.)

Section 821 of H.R. 4200 as reported by the House Armed Services Committee would require DOD to plan and budget for sustaining and modernizing existing weapon systems while DOD waits for those systems to be replaced by transformational weapon systems. In discussing this section, the committee's report states:

This section would require the Department of Defense to plan and budget for the sustainment and modernization of current military systems until such time that the replacement system under development is fielded and assumes responsibility for the mission. The committee is aware of the fiscal realities that make it difficult to fund simultaneously the development of transformational future military systems and the maintenance and sustainment of current military systems. In general, the military services map out program strategies for sustainment and modernization. However, significant gaps exist. In 2003, the General Accounting Office reported that 15 of the 25 systems reviewed had insufficient funding requested by the Department of Defense or projected in the Future Years Defense Program to execute the military services' program strategies to sustain or replace their equipment. It is the responsibility of the

Department of Defense to develop military systems that provide the armed forces with superiority over potential adversaries. However, funding for transformational future systems that are decades from field operational capability must not preclude the funding required to sustain and modernize the current force. The committee is concerned that escalating cost growth in development programs and accelerating transformation is funded by underinvestment in the current force which may undermine the readiness and capabilities of the forces that we must rely upon for the foreseeable future. (Page 348.)

On the topic of defense satellites, the committee's report states:

With the advent of operationally responsive [satellite] launches, the committee believes research and development should begin on the use of satellites that would fit this new family of launch vehicles and address near-term warfighter requirements. These new satellites should provide critical capabilities from space in an affordable, reliable, and timely manner. This new perspective on satellite acquisition represents a truly transformational strategy and, as such, should be managed by the Secretary of Defense's new Office of Force Transformation. (Page 246.)

On the topic of defense transformation in general, the committee's report states:

The committee supports the efforts of the Department of Defense to transform the armed forces into capabilities based, networked joint forces that are rapidly deployable and more lethal than today's highly capable military. Despite the Department's success in recent combat operations, the committee recognizes that the Department's transformation goals are long term, evolving objectives that will be very difficult to achieve without a joint strategy to guide it. The committee is encouraged that the Army has embarked on an aggressive transformation program that encompasses all aspects of the Army, including personnel policies, unit structure, doctrine, and equipment. While the committee has concerns about the development strategy for the Future Combat System, addressed elsewhere in this report, the committee believes the Army's plan to create more combat power by fielding at least 45 active maneuver brigades is the correct approach.

Similarly, the Navy, the Marine Corps, and the Air Force have embraced transformation as an objective, and have proposed several specific concepts as transformational. The committee is concerned that each military service has embarked on its own transformational campaign, without an enforceable, integrated joint forces roadmap to ensure the services' plans are mutually supportive and overlap only when necessary. For that reason, the committee questions the services' plans to sustain excessive headquarters structure despite the services' increasing requests for information technology funding purportedly designed to flatten combat organizations.

Accordingly, the committee believes that the Joint Forces Command should continue to evolve as the principal coordinator of service transformation efforts. (Pages 354-355.)

Title XV of H.R. 4200 as reported by the House Armed Services Committee authorizes supplemental funding for operations in Iraq and Afghanistan. In discussing this title, the report states:

The committee fully supports the Army's efforts to transform the structure of its divisions into smaller organizations to create additional combat relevant units. This reorganization known as "modularity" will contribute to the reduction of stress on our troops due to the high operational tempo of operations in southwest Asia. This title authorizes an aggressive down payment for the equipment costs of both modularity and the rapid fielding initiative as displayed in the Army unfunded requirements list so that every infantry soldier has the equipment necessary to perform their mission. (Page 380.)

The committee's report also mentions the concept of transformation in connection with a variety of other matters, including numerous equipment acquisition programs, science and technology programs, intelligence, the defense industrial base, increased Army end strength, logistics, military health care, DOD business practices, and base closure and realignment.

Senate. Section 1033 of the FY2005 defense authorization bill (S. 2400) as reported by the **Senate Armed Services Committee** (S.Rept. 108-260 of May 11, 2004) would establish a separate program element for operationally responsive satellite payloads to be managed by the Office of Force Transformation, and authorize \$25 million for the new program. In discussing Section 1033, the committee's report states:

The committee notes that, in testimony before the Strategic Forces Subcommittee, Committee on Armed Services of the Senate, the Under Secretary of the Air Force, the Commander, U.S. Strategic Command, the Commander of Air Force Space Command, and the Director of the Office of Force Transformation all indicated their belief that the development of small, operationally responsive satellites would make a valuable contribution to the operational effectiveness of the warfighter. The Air Force budget request includes \$35.4 million to develop an operationally responsive launch vehicle, intended to place small payloads into low earth orbit within hours or days of the requirement to proceed, and to do so inexpensively. The Office of Force Transformation has sponsored the development of experimental tactical satellites (TACSATs), intended to demonstrate the rapid design and fabrication of operationally useful satellite payloads. The committee notes that TACSAT — 1 and TACSAT — 2 are fully funded, but that no funding has been programmed for TACSAT — 3, a payload that would be developed in fiscal year 2005, or other future TACSAT missions. The committee believes that the continued development of operationally responsive satellite payloads must proceed vigorously in parallel with operationally responsive launch capabilities.

The committee believes that acquisition and operational models based on inexpensive launch and smaller satellites provide the promise of enhancing the effectiveness of U.S. military and intelligence space operations and mitigating some of the endemic development problems that have afflicted U.S. space programs over the past decade. The committee believes that such an approach could reduce the vulnerability of on-orbit capabilities, improve responsiveness of space assets to warfighter needs, expand the space industrial base, refresh on-orbit technology on a more regular basis, and lower technical risk and reduce management challenges.

The committee recognizes that developing standards and protocols to enable rapid integration of payloads, satellite buses, and launch vehicles will be

critical to the success of an approach based on more numerous launches of small payloads, and encourages the Department of Defense to develop such standards and protocols promptly. (Page 375.)

On the topic of defense transformation in general, the committee's report states:

In order to meet the comprehensive defense needs of the 21st Century, the U.S. Armed Forces must be technologically advanced, fully integrated forces that can rapidly and decisively reach the far corners of the world to deter, disrupt, or defeat those who threaten the United States, its interests overseas, and its friends and allies. Winning the global war on terrorism and defending the homeland must be the highest priorities, but the U.S. Armed Forces must simultaneously prepare for the future. The modernization and transformation of America's Armed Forces is achievable and necessary, if the U.S. military is to be prepared for current and future responsibilities. The President's budget request for defense for fiscal year 2005 continues the real increases in defense spending of recent years to sustain readiness, enhance the quality of life of military personnel and their families, and modernize and transform the U.S. Armed Forces to meet current and future threats. (Page 2.)

The committee's report also mentions the concept of transformation in connection with a variety of other matters, including numerous equipment acquisition programs, science and technology programs, manufacturing technologies and processes, logistics, DOD-funded scholarships for science and engineering degrees, and military health care, including health-care business practices.

Conference Report. Section 403 of the conference report (H.Rept. 108-767 of October 8, 2004) on H.R. 4200/P.L. 108-375 of October 28, 2004 states in part:

SEC. 403. ADDITIONAL AUTHORITY FOR INCREASES OF ARMY ACTIVE DUTY PERSONNEL END STRENGTHS FOR FISCAL YEARS 2005 THROUGH 2009.

(a) AUTHORITY. — During fiscal years 2005 through 2009, the Secretary of Defense is authorized to increase by up to 30,000 the end strength authorized for the Army, and by up to 9,000 the end strength authorized for the Marine Corps, above the levels authorized for those services in the National Defense Authorization Act for Fiscal Year 2004, as necessary —

(1) to support the operational mission of the Army and Marine Corps in Iraq and Afghanistan; and

(2) with respect to end strengths for the Army, to achieve transformational reorganization objectives of the Army, including objectives for increased numbers of combat brigades, unit manning, force stabilization and shaping, and rebalancing of the active and reserve component forces of the Army....

Section 595 of the conference report states:

SEC. 595. REPORTS ON CERTAIN MILESTONES RELATING TO DEPARTMENT OF DEFENSE TRANSFORMATION.

(a) MILITARY-TO-CIVILIAN CONVERSIONS. — Not later than January 31, 2005, the Secretary of Defense shall submit to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives a report providing information as to the number of positions in the Department of Defense that were converted during fiscal year 2004 from performance by military personnel to performance by civilian personnel of the

Department of Defense or contractor personnel. The report shall include the following:

- (1) A description of the skill sets of the military positions converted.
- (2) Specification of the total cost of the conversions and how that cost is being met.
- (3) The number of positions in the Department of Defense projected for such conversion during the period from March 1, 2005, through January 31, 2006.

(b) **MILITARY-TO-MILITARY CONVERSIONS.** — Not later than March 31 of each of 2005, 2006, and 2007, the Secretary of Defense shall submit to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives a report on —

- (1) the number of units, by type, converted from one primary military capability to another during the previous fiscal year and, for each such unit, what the new unit designation and new military capabilities are;
- (2) the number of military personnel, by military skill, who have converted during the previous fiscal year from one primary military skill to another, with a listing of the military skills to which the individuals converted;
- (3) a description of the military unit and military personnel conversions planned for the upcoming fiscal year; and
- (4) a statement of whether the overall unit and military personnel conversions planned for the previous fiscal year were met, and for each such planned conversion, the reasons why the planned conversion was or was not met.

(c) **ARMY TRANSFORMATION TO BRIGADE STRUCTURE.** — The Secretary of the Army shall submit to the Committee on Armed Services of the Senate and the Committee on Armed Services of the House of Representatives an annual report on the status of the internal transformation of the Army from a division-orientated force to a brigade-orientated force. Such report shall be submitted not later than March 31 of each year, except that the requirement to submit such annual report shall terminate when the Secretary of the Army submits to those committees the Secretary's certification that the transformation of the Army to a brigade-orientated force has been completed. Upon the submission of such certification, the Secretary shall publish in the Federal Register notice of that certification and that the statutory requirement to submit an annual report under this subsection has terminated.

In connection with this section, the conference report states:

The House bill contained a provision (sec. 597) that would require the Secretary of Defense to submit reports to the Committees on Armed Services of the Senate and the House of Representatives on implementation of transformational milestones identified by the Department of Defense.

The Senate amendment contained no similar provision.

The Senate recedes with an amendment to remove the requirement for a feasibility study on a civilian skill corps.

The conferees expect that a study on the feasibility of a civilian skill corps will be conducted under authority provided elsewhere in this Act concerning accession of persons with specialized skills.

With respect to military-to-civilian conversions in Navy medical and dental fields that are proposed for fiscal year 2005, the conferees are concerned that the

specialties targeted for conversion are those most needed by military families, including pediatrics, family practice, and pharmacy. The conferees urge not only the Secretary of the Navy but also the secretaries of the other military departments to ensure that plans for military-to-civilian conversions do not adversely affect the quality and access of military health care required by military families. The conferees direct the Secretary of Defense to provide a report to the Committees on Armed Services of the Senate and the House of Representatives not later than 90 days following enactment of this Act that describes the plans of each military department for military-to-civilian conversions of medical and dental personnel in fiscal year 2006. (Pages 689-690)

Section 901 of the conference report states in part:

SEC. 901. STUDY OF ROLES AND AUTHORITIES OF THE DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING.

(a) STUDY REQUIRED. — The Secretary of Defense shall carry out a study of the roles and authorities of the Director of Defense Research and Engineering.

(b) CONTENT OF STUDY. — The study under subsection (a) shall include the following:

(1) An examination of the past and current roles and authorities of the Director of Defense Research and Engineering.

(2) An analysis to determine appropriate future roles and authorities for the Director, including an analysis of the following matters:

(A) The relationship of the Director to other senior science and technology and acquisition officials of the military departments and the Defense Agencies.

(B) The relationship of the Director to the performance of the following functions:...

(ix) The development of new technologies in support of the transformation of the Armed Forces....

Section 913 of the conference report states in part:

SEC. 913. OPERATIONALLY RESPONSIVE NATIONAL SECURITY SATELLITES.

(a) PLANNING, PROGRAMMING, AND MANAGEMENT. — (1) Chapter 135 of title 10, United States Code, is amended by inserting after section 2273 the following new section:

“§ 2273a. Operationally responsive national security payloads and buses: separate program element required

“(a) REQUIREMENT FOR PROGRAM ELEMENT. — The Secretary of Defense shall ensure that, within budget program elements for space programs of the Department of Defense, there is a separate, dedicated program element for operationally responsive national security payloads and buses of the Department of Defense for space satellites and that programs and activities for such payloads and buses are planned, programmed, and budgeted for through that program element.

“(b) MANAGEMENT AUTHORITY. — The Secretary of Defense shall assign management authority for the program element required under subsection (a) to the Director of the Office of Force Transformation of the Department of Defense.

“(c) DEFINITION OF OPERATIONALLY RESPONSIVE. — In this section, the term ‘operationally responsive’, with respect to a national security

payload and bus for a space satellite, means an experimental or operational payload and bus with a weight not in excess of 5,000 pounds that —

“(1) can be developed and acquired within 18 months after authority to proceed with development is granted; and

“(2) is responsive to requirements for capabilities at the operational and tactical levels of warfare.”....

In connection with this section, the conference report states:

The budget request included \$19.6 million in PE 65799D8Z for the force transformation directorate, but no funds for operationally responsive satellite payloads and busses.

The House bill would authorize an increase of \$25.0 million in PE 65799D8Z for operationally responsive satellite payloads.

The Senate amendment would authorize \$25.0 million in a new program element for operationally responsive satellite payloads.

The conferees believe that smaller, less expensive satellites may provide a means of achieving more rapid and effective deployment of space-based military capabilities than is now possible. The conferees are encouraged by Air Force efforts to develop small, lowcost space launch vehicles as an essential step for enabling the launch of such satellites, but are concerned that the effort to develop viable payloads for these rockets is not adequately funded. The conferees note that the Office of Transformation is working with the Air Force Research Laboratory to develop lightweight, experimental tactical satellites (TACSATs), but that this effort lacks dedicated funding. The conferees also believe that the development of standards, protocols, and interfaces for common satellite bus components will be key to producing affordable small satellites. The conferees agree to authorize \$39.6 million in PE 65799D8Z, an increase of \$20.0 million, for further development of TACSATs and common small satellite bus components. The conferees expect, consistent with section 913 of this Act, that future funding requests for operationally responsive payloads will be forwarded in a separate and dedicated program element. (Page 580; see also page 746.)

Section 1042 of the conference report states in part:

SEC. 1042. REPORT ON POST-MAJOR COMBAT OPERATIONS PHASE OF OPERATION IRAQI FREEDOM.

(a) **REPORT REQUIRED.** — (1) Not later than June 1, 2005, the Secretary of Defense shall submit to the congressional defense committees a report on the conduct of military operations during the post-major combat operations phase of Operation Iraqi Freedom.

(2) The report shall be prepared in consultation with the Chairman of the Joint Chiefs of Staff, the commander of the United States Central Command, and such other officials as the Secretary considers appropriate.

(b) **CONTENT.** — (1) The report shall include a discussion of the matters described in paragraph (2), with a particular emphasis on accomplishments and shortcomings and on near-term and long-term corrective actions to address such shortcomings.

(2) The matters to be discussed in the report are as follows:...

(S) The most critical lessons learned that could lead to long-term doctrinal, organizational, and technological changes, and the probable effects that an implementation of those changes would have on current visions, goals, and plans for transformation of the Armed Forces or the Department of Defense....

Section 1043 of the conference report states in part:

SEC. 1043. REPORT ON TRAINING PROVIDED TO MEMBERS OF THE ARMED FORCES TO PREPARE FOR POST-CONFLICT OPERATIONS.

(a) STUDY ON TRAINING. — The Secretary of Defense shall conduct a study to determine the extent to which members of the Armed Forces assigned to duty in support of contingency operations receive training in preparation for post-conflict operations and to evaluate the quality of such training.

(b) MATTERS TO BE INCLUDED IN STUDY. — As part of the study under subsection (a), the Secretary shall specifically evaluate the following:...

(4) The adequacy of training transformation to emphasize post-conflict operations, including interagency coordination in support of commanders of combatant commands....

The conference report states:

The budget request included \$674.8 million in PE 63845F for transformational military satellite communications (TSAT).

The House bill would authorize a decrease of \$100.0 million in PE 63845F.

The Senate amendment would authorize a decrease of \$100.0 million in PE 63845F.

The conferees agree to authorize \$374.8 million in PE 63845F, a decrease of \$300.0 million.

The conferees strongly support the objectives of the TSAT program, including much higher communications capacity, assured connectivity for a much larger number of mobile and fixed forces, and the ability to protect these capabilities against emerging threats. The conferees, however, have had continuing concerns related to the risk of the current acquisition approach and potential program delays, which the conferees believe could elevate operational risks resulting from gaps in the military satellite communications (MILSATCOM) architecture.

The conferees are aware of program options that could leverage both current MILSATCOM program investments and TSAT development efforts. The conferees believe that such an approach could accelerate the deployment of advanced communications capabilities, provide the opportunity to incrementally demonstrate advanced satellite communications technology, and provide a lower risk path to meeting TSAT requirements. The conferees believe that such an approach is potentially more consistent with spiral development and capabilities-based acquisition.

The conferees direct the Secretary of Defense to evaluate modified TSAT acquisition strategies that streamline the program structure and leverage current

MILSATCOM investment, and to provide a report to the congressional defense committees on that evaluation by March 1, 2005. (Page 558)

The conference report also states, in a section on coordination between DOD and the National Aeronautics and Space Administration (NASA):

The conferees also endorse the Secretary of Defense's emphasis on transformational technologies. One of the more promising technologies under development is hypersonic propulsion, which when further developed will provide significantly improved operational capabilities for both manned and unmanned flight, missile defense and a single-stage-to-flight capability that could provide rapid access to space. Unfortunately, due to changing priorities within both the Air Force and NASA, funding for such efforts has been reduced to insignificant levels.

The conferees direct the Secretary of Defense to submit a report to the congressional defense committees by March 15, 2005, which details the Department's plans to provide the required funding to pursue a development program for transition of hypersonic technologies to an integrated demonstration system that validates their affordability and effectiveness to support prompt global strike and assured space access missions. The report should analyze the results and technological advances enabled by the X — 43 series of programs and other efforts to develop a detailed technology roadmap and investment strategy consistent with meeting future military needs in hypersonics. The conferees believe the capabilities to be realized through a successful hypersonic development program justify the sustained and full support of the Department and NASA. (Page 582)

The conference report also mentions transformation in connection with a science, mathematics, and research for transformation (SMART) defense scholarship pilot program (Section 1105; pages 264-266 and 774), Army logistics maintenance information (page 642), and DOD educational facilities for military dependents (Section 2896; see page 855).

FY2005 Defense Appropriations Bill (H.R. 4613/P.L. 108-287)

House. The House Appropriations Committee, in its report (H.Rept. 108-553 of June 18, 2004) on H.R. 4613, states:

As for the Department's acquisition programs, in general the Committee believes that many of the "transformational" programs under development are worthy objectives, both playing to American advantages and future threat environments. These programs stress the use of modern information technology and manufacturing techniques to produce more agile, flexible, and lethal combat platforms and systems. After thorough examination, however, the Committee has concluded that a consistent theme runs through many of these programs, as proposed in the fiscal year 2005 budget — namely, the development programs are currently too aggressive and optimistic in terms of research, testing, and production profiles. The Committee believes that a more measured "transition to transformation" is in order, especially in the areas of Naval surface combatants and Army combat vehicles. (Page 6)

The committee notes that its report, among other things,

Makes recommendations on certain programs that will allow the Department to “transition to transformation”. For the long-term, the Committee supports the Department’s efforts to transform, but makes appropriate adjustments to programs that have “come too far, too fast”.

The report states:

Largely due to timing, the Committee notes that the President’s budget does not include funding to address two major emerging requirements, both centered on the nation’s ground forces.

First, at roughly the same time the budget was submitted the Army announced the most ambitious restructuring of its combat formations in decades. This reorganization, known as “modularity”, will transform the structure of Army divisions to create additional combat relevant units, centered on brigades. This plan will not just lead to a more flexible, deployable Army, but by creating additional combat formations, it should contribute to the reduction of stress on our troops resulting from the high operational tempo of recent years. The Army is moving rapidly to institute this new structure, but no funds for this initiative were requested in the fiscal year 2005 budget. (Page 5.)⁵⁷

The report also states:

The Committee has provided an additional \$25,000,000 to the Force Transformation Directorate only for the Operationally Responsive Satellite program. The Committee notes that the program has been authorized in both the House and Senate. The Committee fully supports the program objectives as discussed in both the House and Senate authorization reports. The Committee sees great promise that this approach could provide transformational spacebased capabilities to warfighters in a timely and cost-effective manner. (Page 337.)

The report also states:

The Committee is aware that the Navy’s senior leadership has initiated a series of discussions focused on how best to transition from today’s force to the “transformational” force of the future. In general, these discussions have focused on the most efficient and effective methods of addressing combat losses as well as bridging potential gaps in operational capability until new systems are available for use.

The Committee recognizes that current operations have caused the Navy to re-evaluate the timeframe in which it can maintain its warfighting capability with existing technology. The plan of just two short years ago was to maintain aircraft and certain ship classes at existing levels, while anticipating the delivery of transformational systems such as the Joint Strike Fighter and Littoral Combat Ship. Ongoing operations as well as schedule slips for some major weapons systems require the Navy to consider a period of transition. This period of transition may include replacement of combat losses with the next generation of

⁵⁷ The second unmet budget requirement listed by the committee was “the new set of recapitalization challenges confronting all the services — but particularly the Army and Marine Corps — as a result of Operations Iraqi Freedom and Enduring Freedom.”

equipment, such as the V — 22, unplanned upgrades to the F/A — 18 series aircraft, and adjusting production levels to achieve the most productive ratios.

The Committee does not believe the Navy nor the Department of Defense as a whole can abandon the drive to transformation. However, it is apparent that ongoing operational tempo requires an adjustment to original plans and that a “transition to transformation” may be the best way to maintain and improve capability. The Committee is encouraged that the Navy has initiated such planning and believes that future budget requests should support this effort. (Page 145)

Senate. The Senate report (S.Rept. 108-284 of June 24, 2004) on the FY2005 defense appropriations bill (S. 2559) states:

The budget request included \$774,800,000 for the transformational military satellite [TSAT] communications program. Current plans project a cost increase of over 50 percent during fiscal year 2006, reaching an annual funding level of over \$1,000,000,000.

The Committee supports the efforts of the Air Force to develop significant increases in bandwidth available to the military. TSAT development holds the potential to improve communications capability through the use of lasers, internet protocol packets, and integration with a new ground communications network. Current Air Force estimates of the cost to complete the TSAT program approximate \$12,000,000,000. This estimate is nearly double the estimated cost to complete in the fiscal year 2004 request.

As noted above, the Committee remains acutely concerned that projected investments in Air Force space programs are not sustainable. The technical risks associated with the deployment of a TSAT constellation are considerable. The Committee recommends a decrease of \$400,000,000. Despite the recommended reduction in funds available to the program, sufficient resources remain to support technology development and risk reduction activities. In fact, at the recommended level, available funding increases by 10 percent above the fiscal year 2004 levels. (Page 168)

The report also states:

The Committee is concerned about the number of “pilot” programs requested within the Office of the Secretary Defense. These programs include Reducing Total Ownership Costs, Rapid Acquisition Initiatives, Transformation Initiatives, and Horizontal Fusion. The funding requests for these programs fail to outline the activities and projects to be financed, but rather propose that the Congress appropriate “pots” of money for broad programmatic objectives where specific activities are identified after the funding is provided. For example, the fiscal year 2005 budget request for the new start program Reducing Total Ownership Costs broadly describes the program’s objective to, “optimize returns on investments that reduce operating and support costs for systems.” The Department plans to solicit proposals and make project selections after funding has been granted; thus no defined list of projects is available.

The Committee finds this budgetary practice unacceptable and recommends reducing funding for these programs. The Committee expects the Department to adhere to traditional budget justification practices and provide detailed

information on the projects and activities to be funded with the budget request.
(Page 180)

The report also states:

The Committee is extremely displeased by the Air Force's continued use of a flawed and irresponsible financial strategy for the C — 17 multiyear procurement contract. In fiscal year 2003, the Air Force proposed a budget request it referred to as "transformational". The Committee, however, saw it for what it was — an incremental financing scheme that abused the political support for this program and flaunted acquisition regulations and standard practices.
(Page 192.)

The report also mentions transformation in connection with small mobile weapons systems for force protection (page 146) and DoD's language training transformation initiatives (pages 191-192).

Conference Report. The conference report (H.Rept. 108-622 of July 20, 2004) on H.R. 4613 (P.L. 108-287 of August 5, 2004) mentions transformation in connection with the Navy Shore Infrastructure Transformation (NSIT) program at Navy Region Northwest (page 108).

Appendix A: Additional Reading

White House Publications

The White House. The National Security of the United States of America. September 2002.
[<http://www.whitehouse.gov/nsc/nss.pdf>]

DOD Publications

Elements of Defense Transformation. October 2004. 17 pp.

Military Transformation: A Strategic Approach. November 18, 2003. 35 pp.

Transformation Planning Guidance. April 10, 2003. 34 pp.

Network Centric Operations Conceptual Framework Version 1.0. April 12, 2004. 55 pp.

Serving a Nation At War. May 19, 2004. 24 pp.

2003 Army Transformation Roadmap. January 28, 2004. 162 pp.

2003 U.S. Air Force Transformation Flight Plan. February 12, 2004. 166 pp.

2003 Naval Transformation Roadmap. April 20, 2004. 94 pp.

Unmanned Aerial Vehicles Roadmap. December 31, 2002. 195 pp.

Training Transformation Implementation Plan. July 7, 2003. 21 pp.

U.S. Department of Defense, Office of the Secretary. *Quadrennial Defense Review Report*. U.S. Dept. of Defense, Office of the Secretary, September 30, 2001, 71 p. [<http://www.defenselink.mil/pubs/qdr2001.pdf>].

Report of the Defense Science Board Task Force on DOD Warfighting Transformation. September 1999. 36 p.

Mahnken, Thomas G. and James R. FitzSimonds. *The Limits of Transformation: Officer Attitudes Toward the Revolution in Military Affairs*. Newport Paper #17, (Newport: Naval War College, 2003).

(Most of these publications can be found at the website for DOD's Office of Force Transformation [<http://www.oft.osd.mil>].)

CRS Reports

CRS Report RS20787, *Army Transformation and Modernization: Overview and Issues for Congress*, by Edward F. Bruner. (Updated periodically) 6 p.

CRS Report RL32476, *U.S. Army's Modular Redesign: Issues for Congress*, by Andrew Feickert. (Updated periodically) 6 p.

CRS Report RS20859, *Air Force Transformation*, by Christopher Bolkcom. (Updated periodically) 6 p.

CRS Report RS20851, *Naval Transformation: Background and Issues for Congress*, by Ronald O'Rourke. (Updated periodically) 6 p.

CRS Report RL32411, *Network Centric Warfare: Background and Oversight Issues for Congress*, by Clay Wilson. 35 p.

CRS Report RL31425, *Military Transformation: Intelligence, Surveillance, and Reconnaissance*, by Judy G. Chizek. January 17, 2003. 30 p.

CRS Report RL32151, *DOD Transformation Initiatives and the Military Personnel System: Proceedings of a CRS Seminar*, by Lawrence Kapp. November 12, 2003. 33 p.

CRS Report RS21975, *U.S. Military Overseas Basing: Background and Oversight Issues for Congress*, by Jon D. Klaus. 6 p.

CRS Report RL31916, *Defense Department Original Transformation Proposal: Compared to Existing Law*, by Robert L. Goldich, *et al.* Updated May 19, 2003. 57 p.

GAO Reports

Military Transformation: The Army and OSD Met Legislative Requirements for First Stryker Brigade Design Evaluation, but Issues Remain for Future Brigades. GAO-04-188 December 12, 2003. 51 pp.

Military Transformation: Realistic Deployment Timelines Needed for Army Stryker Brigades. GAO-03-801 June 30, 2003. 26 pp.

Military Transformation: Army's Evaluation of Stryker and M-113A3 Infantry Carrier Vehicles Provided Sufficient Data for Statutorily Mandated Comparison. GAO-03-671 May 30, 2003. 29 pp.

Defense Transformation: DOD's Proposed Civilian Personnel System and Governmentwide Human Capital Reform. GAO-03-741T May 1, 2003. 10 pp.

Defense Transformation: Preliminary Observations on DOD's Proposed Civilian Personnel Reforms. GAO-03-717T April 29, 2003. 22 pp.

Military Transformation: Progress and Challenges for DOD's Advanced Distributed Learning Programs. GAO-03-393 February 28, 2003. 63 pp.

Military Transformation: Actions Needed to Better Manage DOD's Joint Experimentation Program. GAO-02-856 August 29, 2002. 38 pp.

Military Transformation: Army Actions Needed to Enhance Formation of Future Interim Brigade Combat Teams. GAO-02-442 May 17, 2002. 48 pp.

Military Transformation: Army Has a Comprehensive Plan for Managing Its Transformation but Faces Major Challenges. GAO-02-96 November 16, 2001. 47 pp.

Military Transformation: Navy Efforts Should Be More Integrated and Focused. GAO-01-853 August 2, 2001. 32 pp.

Defense Acquisition: Army Transformation Faces Weapon Systems Challenges. GAO-01-311 May 21, 2001. 23 pp.

Military Transformation[:] Clear Leadership, Accountability, and Management Tools Are Needed to Enhance DOD's Efforts to Transform Military Capabilities. GAO-05-70 December 2004.

Other Publications

Finelli, Frank. Transforming Aerospace Power. *Airpower Journal*, Vol. XIII, No. 2 (Summer 1999): 4-14.
[<http://www.airpower.maxwell.af.mil/airchronicles/apj/apj99/sum99/finelli.pdf>]

Johnson, Edgar M. *Workshop Introducing Innovation and Risk: Implications of Transforming the Culture of DoD.* Washington, 2004, 35 pp. (Institute for Defense Analyses, March 2004)

Krepinevich, Andrew. *The Bush Administration's Call for Defense Transformation: A Congressional Guide.* Washington, Center for Strategic and Budgetary Assessments, 2001. 3 p.

Krepinevich, Andrew, and Barry Watts and Robert Work. *Meeting The Anti-Access and Area-Denial Challenge.* Washington, Center for Strategic and Budgetary Assessments, 2003. 95 p.

Krepinevich, Andrew F. *Lighting the Path Ahead: Field Exercises and Transformation.* Washington, Center for Strategic and Budgetary Assessments, 2002. 37 p.

Krepinevich, Andrew F., Jr. *The Military-Technical Revolution: A Preliminary Assessment.* Washington, Center for Strategic and Budgetary Assessments, 2002. 54 pp. (This is a public reprint of an influential report on military transformation issued by the DoD Office of Net Assessment in July 1992.)

National Defense Panel. *Transforming Defense: National Security in the 21st Century.* Washington, Department of Defense, November 1997.
[<http://www.dtic.mil/ndp/FullDoc2.pdf>]

McGregor, Douglas A. *Breaking the Phalanx: A New Design for Landpower in the 21st Century* (Westport, CT: Praeger, 1997).

O'Hanlon, Michael. *Technological Change and the Future of Warfare*. Washington: Brookings Institution, 2000. Full text available on line: [http://brookings.nap.edu/books/0815764391/html/index.html]

Owens, William A. The Emerging System of Systems. *U.S. Naval Institute Proceedings*, May 1995, pp. 36-39.

Warden, Colonel John A. III. *The Air Campaign: Planning for Combat* (Washington, DC: National Defense University Press, 1998).