

# CRS Report for Congress

Received through the CRS Web

## Naval Transformation: Background and Issues for Congress

Ronald O'Rourke  
Specialist in National Defense  
Foreign Affairs, Defense, and Trade Division

### Summary

The Department of the Navy (DoN) has several efforts underway to transform, or change, U.S. naval forces and prepare them for future military challenges. DoN officials are generally satisfied with the scope and pace of their transformation efforts, but some advocates of defense transformation are not and recommend that current efforts be expanded and accelerated. This report is intended particularly for Members and staffers who cover defense issues, especially U.S. naval forces, defense technology, and long-range military planning. It will be updated as events warrant.

### Introduction and Issue for Congress

This report focuses on the transformation of U.S. naval forces – the Navy and the Marine Corps, which are both contained in the Department of the Navy (DoN).<sup>1</sup> The issue for Congress is whether the current DoN transformation efforts are sufficient, and if not, what the options might be for accelerating or expanding these efforts.

### Background

#### What is defense transformation?

Defense transformations are defined as infrequent, large-scale changes in weapons and concepts of military operations that lead to major changes in the structure and organization of military forces and the ways in which wars are fought. In contrast to incremental or evolutionary military change brought about by normal modernization efforts, defense transformations are more likely to feature discontinuous or disruptive

---

<sup>1</sup> For a discussion of Army and Air Force transformation efforts, see CRS Report RS20787, *Army Transformation and Modernization: Overview and Issues for Congress*, by Edward F. Bruner. Washington, 2001. (Updated periodically) 6 p.; and CRS Report RS20859, *Air Force Transformation: Background and Issues for Congress*, by Christopher Bolkom. Washington, 2001. (Updated periodically) 6 p.

forms of change. Such transformations are usually brought about by the emergence of key new technologies that permit the creation of new kinds of military forces and approaches to warfare. By most accounts, there have been a few or several such transformations in recent decades or centuries. More recent examples that are sometimes cited include Germany's creation in the 1930s of the concept of rapid blitzkrieg-style warfare, and the U.S. Navy's creation at the same time of long-distance, aircraft carrier-centered naval warfare as a replacement for battleship-centered operations.

Some military analysts believe that recent new technologies – including advanced information technologies (IT), distributed sensors, unmanned vehicles, and precision-guided munitions – have set the stage for a new defense transformation. They also believe that U.S. military forces must transform themselves if they are to be adequately prepared for 21<sup>st</sup>-Century military challenges, particularly so-called asymmetric challenges, in which adversaries avoid competing head-on against current U.S. military strengths.

Transformation advocates believe that a key asymmetric challenge in the next 10 to 25 years will be the development of adversary military capabilities intended to prevent U.S. military forces from gaining access to the ports, airfields, bases, staging areas, and littoral (near-shore) sea areas that the United States now depends on to mount military operations in distant military theaters. Systems intended to counter U.S. naval forces in littoral areas could include advanced diesel-electric submarines, mines, anti-ship cruise missiles, air-defense systems, and – potentially – weapons of mass destruction. Advocates believe that U.S. military forces must transform themselves to successfully counter these so-called anti-access or area-denial capabilities.

Key transformation advocates include Andrew Marshall, the long-time director of DoD's Office of Net Assessment,<sup>2</sup> Andrew Krepinevich, a protégé of Marshall's who is now the Executive Director of the Center for Strategic and Budgetary Assessments (CSBA),<sup>3</sup> and retired Navy Admiral William A. Owens.<sup>4</sup>

### **Bush Administration interest in defense transformation.**

The Bush Administration has identified transformation as a major goal of its defense policies and programs. This goal was first articulated in a speech on defense policy given by then-Governor Bush at the Citadel in South Carolina in September 1999, and has been reiterated by the Administration on a number of occasions since.

---

<sup>2</sup> For articles about Andrew Marshall, see Ricks, Thomas E. Warning Shot. *Wall Street Journal*, July 15, 1994: A1, A5; and Winik, Jay. Secret Weapon. *Washingtonian Magazine*, April 1999: 45-55.

<sup>3</sup> For a recent example of a CSBA report with recommendations for implementing defense transformation, see Kosiak, Steven, Andrew Krepinevich, and Michael Vickers. *A Strategy for a Long Peace*. Washington, CSBA, 2001. (January 2001) 80 p.

<sup>4</sup> For an example of Owens' proposals for future naval forces, see Owens, William A. *High Seas*. Annapolis (MD), Naval Institute Press, 1995. 184 p.

## **Navy and Marine Corps transformation efforts.**

The Navy and Marine Corps currently have several initiatives underway that they describe as aimed at transforming U.S. naval forces.

**Marine Corps Warfighting Laboratory.** The Marine Corps Warfighting Laboratory (MCWL), earlier known as the Commandant's Warfighting Laboratory, is arguably the first of DoN's current major transformation initiatives. Since 1995, the MCWL, located at the Marine Corps base at Quantico, VA, has directed a series of small- and large-scale experimental exercises intended to explore new technologies and operational concepts for the Marine Corps. Technologies explored have ranged from less-than-lethal weapons to small, man-portable unmanned air vehicles (UAVs). Operational concepts examined have ranged from tactics for rapidly penetrating enemy coastal areas with dispersed forces to new methods for carrying out military operations in urban areas.<sup>5</sup>

**Navy Warfare Development Command.** In 1998, the Navy established the Navy Warfare Development Command (NWDC), located at the Naval War College at Newport, RI, to generate ideas for naval transformation and to act as a clearinghouse and evaluator of ideas generated in other parts of the Navy. The NWDC is now overseeing a series of major fleet exercises, known as Fleet Battle Experiments (FBEs), that are intended to explore potential new naval operational concepts. (The Navy and Marine Corps will also participate in transformation-oriented joint [multiservice] exercises directed by the Joint Forces Command.)<sup>6</sup>

**Network-Centric Warfare.** The central concept underpinning current DoN transformation efforts is network-centric warfare (NCW), also known as network-centric operations (NCO), which entails using advanced information technologies (IT) to link together personnel, ships, aircraft, and installations into a series of local- and wide-area networks capable of rapidly transmitting critical information. Many in DoN believe that NCW will significantly increase U.S. naval capabilities and operational efficiency. Key NCW efforts include the Navy's Cooperative Engagement Capability (CEC) network for air-defense operations, the IT-21 investment strategy, which is creating a corporate intranet for Navy ships at sea, and the Navy/Marine Corps Intranet (NMCI), which is creating a similar network to link together DoN installations.<sup>7</sup>

**Streetfighter project.** The Streetfighter project, centered at the Naval War College was created by Admiral Arthur Cebrowski, an early promoter of NCW who was then the President of the Naval War College and is now the head of DoD's Office of Transformation. The Streetfighter project is aimed at generating potential new naval

<sup>5</sup> For a discussion of the MCWL and its activities, see Kaufman, Gail. Marine Corps Lab Redefines Experimentation By Thinking Small. Stars and Stripes Omnimedia wire service, February 20, 2001.

<sup>6</sup> For a discussion of the NWDC and its activities, see Sprigg, Robert G. The Navy's Crossroads For Innovation And Transformation. *Sea Power*, February 2001: 31.

<sup>7</sup> For a discussion of NCW, CEC, IT-21, and NMCI, see CRS Report RS20557, *Navy Network-Centric Warfare Concept: Key Programs and Issues for Congress*, by Ronald O'Rourke. Washington, 2001. 6 p. (Updated periodically)

capabilities and operational concepts for fighting in littoral waters defended by anti-access/area-denial forces. Streetfighter concepts are still evolving, but if implemented, Streetfighter forces could constitute a specialized 10 or 20 percent adjunct to today's main naval forces and would comprise three main elements – networks of small, distributed sensors, unmanned vehicles to deploy them, and new kinds of ships, particularly small and fast ships that might more effectively evade enemy targeting. The Navy's plan to build a Littoral Combat Ship (LCS) as part of its DD(X)/Future Family of Surface Combatants program (see below) appears to be an outgrowth of the Streetfighter project.

**Other efforts.** In aviation, the Navy is seeking to increase the number of aim points that an aircraft carrier can attack within a 24-hour period from a couple of hundred to more than one thousand by combining an increased aircraft sortie rate with compact air-launched munitions. The Navy is also developing a next-generation aircraft carrier called the CVX,<sup>8</sup> unmanned air vehicles (UAVs), and (with the Defense Advanced Research Project Agency, or DARPA) a carrier-based unmanned combat air vehicle (UCAV).

Surface-ship transformation efforts center on the future DD(X) destroyer, which will use automation to permit a much smaller crew than previous Navy surface combatants, a new, low-visibility hull design, and advanced sensors and weapons, including a new, longer-ranged gun for providing naval surface fire support. The DD(X) is to be part of a future family of surface combatants that will also include a cruise-like ship (the CG[X]) and the LCS.<sup>9</sup> The Navy and Marine Corps are also conducting experiments with two civilian high-speed catamaran ferries to assess the role that high-speed transport ships using new hull forms might play in DoN's future. In addition, the installation of theater-missile defense systems on Navy surface combatants will give the Navy an ability to project a significant defensive capability inland.

Submarine transformation efforts include a Navy/DARPA project on submarine payloads that has generated ideas for significantly expanding the number and variety of weapons and sensors carried by Navy attack submarines, as well a program to convert up to four Trident Ballistic Missile Submarines (SSBNs) into cruise missile/special operations forces submarines (SSGNs).<sup>10</sup>

The Navy also plans for the DD(X) and other future surface ships and submarines to employ advanced electric-drive propulsion technology and integrated electric power systems.<sup>11</sup>

---

<sup>8</sup> For a discussion of the CVX program, see *Navy CVN-77 and CVNX Aircraft Carrier Programs: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2000. (Updated periodically) 6 p.

<sup>9</sup> For a discussion of the DD-21 program, see CRS Report RS20698, *Navy Zumwalt (DD-21) Class Destroyer Program: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2001. 6 p. (Updated periodically)

<sup>10</sup> For more on this program, see CRS Report 21007, *Navy Trident Submarine Conversion (SSGN) Program: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2002. (Updated periodically) 6 p.

<sup>11</sup> For a discussion of the Navy's efforts regarding electric-drive propulsion and integrated power (continued...)

## Issues for Congress

### Are current DoN transformation efforts sufficient?

One potential issue for Congress is whether current DoN transformation efforts are sufficient in scope and urgency. DoN officials and some Navy supporters appear generally satisfied with current efforts. They argue that U.S. naval forces as currently planned will be able to defeat littoral anti-access/area-denial forces and thereby enable transformed Air Force and Army forces to be deployed into the theater. DoN officials acknowledge the changed strategic environment and the potential to expand or accelerate current naval transformation efforts with additional funding. But they argue that funding demands for naval transformation need to be balanced against funding demands for readiness and for near-term procurement to counter aging of weapons and equipment resulting from the procurement “holiday” of the 1990s.

Advocates of defense transformation believe that current DoD transformation efforts are inadequate and need to be substantially expanded and accelerated if U.S. forces are to be adequately prepared to perform their missions 10 or 25 years from now. They argue that some efforts described by DoN officials as transformational are actually aimed at more normal, incremental forms of change. Transformation advocates question the future survivability of aircraft carriers and other surface ships in heavily defended littoral waters. Concern about ship survivability, they argue, could require U.S. naval forces to operate much further from shore than currently planned, which in turn would raise questions about the appropriateness of current DoN investment plans in various areas, including carrier-based aircraft, naval surface fire support, and amphibious warfare.

Key questions for Congress regarding naval transformation include the following: What is the current and projected anti-access/area-denial threat to U.S. naval forces operating in littoral waters, and will U.S. naval forces under current DoN plans be able to counter this threat both now and over the next 10 or 25 years? Do current DoN plans take optimal advantage of opportunities provided by new technologies for U.S. naval forces to perform their missions in the most cost-effective manner?

### What are the options for expanding naval transformation?

Should Congress choose to explore whether current DoN transformation efforts are adequate, other questions would arise, including: What are the options for expanding or accelerating current naval transformation efforts? The options below have been proposed by transformation advocates as measures to accelerate DoN transformation generally or to exploit specific technological opportunities for new weapons, particularly for countering littoral anti-access/area-denial systems.<sup>12</sup>

---

<sup>11</sup> (...continued)

systems, see CRS Report RL30622, *Electric-Drive Propulsion for U.S. Navy Ships: Background and Issues for Congress*, by Ronald O’Rourke. Washington, 2000. 65 p.

<sup>12</sup> For an additional discussion of options for implementing naval transformation, see O’Rourke, Ronald. Transformation and the Navy’s Tough Choices Ahead: What Are the Options for Policymakers? *Naval War College Review*, Winter 2001.

***Fleet Battle Exercises/experimental forces.*** One option would be to expand the Navy's FBES, incorporate them more fully into normal naval training operations, and ensure that they are experimental undertakings rather than mere demonstrations of existing capabilities. Other options would be to create a standing naval experimental force for testing new ideas without diverting regular Navy forces from their primary missions, or to increase DoN participation in exercises conducted by the Joint Forces Command.

***Unmanned vehicles/netted sensors.*** An additional option would be to expand and accelerate the Navy's current efforts for unmanned underwater vehicles (UUVs), UAVs, UCAVs, and netted sensors. As of last year, the Navy planned on incorporating 6 UCAVs into each carrier air wing by 2017 – a plan that does not appear to keep pace with Sec. 220 of the FY2001 defense authorization act (H.R. 4205/P.L. 106-398), which states, "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...."

***New employment-cycle concepts.*** Another option would be to explore new employment-cycles for Navy ships, with the aim of significantly reducing the stationkeeping multiplier for Navy ships – i.e., the number of ships of a given kind that must be in inventory to keep one ship of that kind on station in an overseas operating areas. Current stationkeeping multipliers for U.S.-homeported ships range from roughly 5 to 1 up to 7 to 1, and can be even higher for aircraft carrier deployments to the Northern Arabian Sea and Persian Gulf. Potential alternative employment-cycle concepts include double or multiple crewing of ships, long-duration forward deployments of ships with rotation of crews that are flown out to and back from the ships, and greater use of land-based simulators to reduce time at sea used for non-deployed training operations.

***Streetfighter project.*** Another option would be to expand the scope of the Streetfighter project, which could involve adding funding for additional design and engineering work and for acquisition and testing of specific near-term Streetfighter proposals. One such proposal is for a small aircraft carrier, called Sea Archer, that would carry about 16 UAVs and UCAVs.

***Alternative force architectures.*** A related but more general option would be to expand current DoN efforts to explore alternatives to the entire current U.S. naval fleet architecture, which is the product of incremental, evolutionary development over the last several decades. Alternative architectures could involve new ship or aircraft designs and new combinations of ships, aircraft, weapons, unmanned vehicles, and sensors.

***Submarine weapons and sensors.*** Another option would be to pursue the ideas generated by the Navy/DARPA submarine payloads program. These ideas, if implemented, could significantly transform the design and capabilities of U.S. submarines.

***Mobile offshore base.*** Another approach would be to pursue the Mobile Offshore Base (MOB), which would be a huge (up to about 5,000-foot-long) mobile, floating platform composed of several large modules derived from designs for floating oil platforms. A MOB could be used to conduct air operations involving land-based aircraft that require long runways, or as an at-sea base for supporting Army and Marine Corps operations in distant theaters. Congress and some of the services have shown some interest in the MOB concept and have spent some funding on it in the past few years for feasibility and preliminary design and engineering studies.