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Naval Transformation: Background and Issues for Congress

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The Department of the Navy (DoN) has several efforts underway to transform U.S. naval forces to 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 accelerated or expanded. This report 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).[1] 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 can be defined as infrequent, large-scale changes in military technology, concepts of operations, and organization that lead to major changes in 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 forms of change. 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) for networked operations, distributed sensors, unmanned vehicles, and precision-guided munitions – have set the stage for a new defense transformation. They

[1] 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 Bolkcom. Washington, 2001. (Updated periodically) 6 p.

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also believe that U.S. military forces must transform themselves if they are to be adequately prepared for 21st-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 so-called anti-access or area-denial capabilities – 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 for countering 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. Key transformation advocates include Andrew Marshall, the long-time director of DoD's Office of Net Assessment,[2] Andrew Krepinevich, a protégé of Marshall's who is now the Executive Director of the Center for Strategic and Budgetary Assessments (CSBA),[3] retired Navy Admiral William A. Owens,[4] and retired Navy Vice Admiral Arthur Cebrowski, former President of the Naval War College and head of DoD's new Office of Force Transformation. Cebrowski was an early promoter of network-centric warfare and created the Streetfighter project (see discussions below).

Bush Administration interest in defense transformation. The Bush Administration has identified transformation as a major goal of its defense policies and programs.[5]

Navy and Marine Corps transformation efforts. The Navy and Marine Corps currently have several initiatives underway that are aimed at transforming U.S. naval forces, including the following:

Marine Corps Warfighting Laboratory. The Marine Corps Warfighting Laboratory (MCWL) 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.

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[2] 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.

[3] 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.

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

[5] See, for example, U.S. Department of Defense. *Quadrennial Defense Review Report*. Washington, 2001. (September 30, 2001) 71 p.

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.

Fleet Battle Experiments. The NWDC is overseeing a series of major exercises, known as Fleet Battle Experiments (FBEs), that are intended to explore new naval operational concepts.[6] The Navy and Marine Corps will also participate in transformation-oriented joint (multiservice) exercises.

Network-centric warfare. The central concept underpinning current DoN transformation efforts is network-centric warfare (NCW), 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 Naval Fires Network (NFN) for gun and missile fire support 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.[7]

New crewing and deployment-cycle concepts. The Navy is beginning to experiment with new concepts for crewing and deploying Navy ships that could achieve a significant reduction in Navy stationkeeping multipliers – the number of Navy ships of a certain kind that are needed to keep one such ship on station in an overseas operating area. The Pacific fleet this year intends to conduct a "sea swap" experiment in which the crews from 3 Spruance class destroyers are used to keep one Spruance-class destroyer on station in an overseas operating area for an extended period of time, eliminating the weeks of deployment time that would be consumed if each of the destroyers transited to and from the operating area in succession, as under traditional Navy deployment procedures. The Pacific fleet plans to follow this with a similar experiment involving 3 Arleigh Burke class Aegis destroyers. The Navy testified on this and other potential innovative crewing and deployment-cycle concepts to the Senate Armed Services Committee in March 2002. In marking up the FY2003 defense authorization bill (S. 2514), the committee included a provision (Section 1023) directing DoD to submit a report to the congressional defense committees by February 2003 on certain such concepts.[8]

Naval aviation. The Navy is working 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

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[6] 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.

[7] For a discussion of NCW, CEC, NFN, IT-21, and NMCI, see CRS Report RS20557, *Navy Network-Centric Warfare Concept: Key Programs and Issues for Congress*, by Ronald O'Rourke. Washington, 2002. 6 p. (Updated periodically)

[8] See pages 356-357 of S.Rept. 107-151 of May 15, 2002, the committee's report on the bill.

CVNX,[9] unmanned air vehicles (UAVs), and (with the Defense Advanced Research Project Agency, or DARPA) a carrier-based unmanned combat air vehicle (UCAV).

Surface ships. Surface-ship transformation efforts center on the DD(X) family of future surface combatants, which will use automation to permit much smaller crews than previous Navy surface combatants, new hull designs, and advanced sensors and weapons.[10] The Navy and Marine Corps, along with the Army, 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.

Submarines. Submarine transformation efforts include a program to convert four Trident ballistic missile submarines (SSBNs) into cruise missile/special operations forces submarines (SSGNs),[11] programs for acquiring unmanned underwater vehicles (UUVs) to be deployed from submarines, studies and exercises for incorporating UAVs into submarines, and a Navy/DARPA project that has generated ideas for significantly expanding the number and variety of weapons and sensors carried by Navy submarines.

Marine Corps sea-basing concept. The Marine Corps is now planning a Maritime Prepositioning Force for the Future (MPF[F]) to replace the current Maritime Prepositioning Ship (MPS) force of sealift ships that preposition equipment and supplies for Marine expeditionary brigades near potential overseas operating areas. As an extension of the MPF(F) planning effort, the Marine Corps is developing a new operational concept called sea-basing under which Marine forces in the future would conduct future operations with less reliance on expeditionary airfields and built-up supply areas ashore and more reliance on air-capable and sealift ships operating at sea.

Electric-drive propulsion. The Navy plans for the DD(X) and other future surface ships and submarines to employ advanced electric-drive propulsion technology and integrated electric power systems. Electric-drive could improve Navy ship capabilities in several areas, including facilitating adoption of directed-energy weapons.[12]

Streetfighter project. The Streetfighter project, centered at the Naval War College was aimed at generating potential new naval capabilities and operational concepts for fighting in littoral waters defended by anti-access/area-denial forces. Streetfighter

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[9] For a discussion of the CVX program, see CRS Report RS20643, *Navy CVNX Aircraft Carrier Program: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2002. (Updated periodically) 6 p.

[10] For a discussion of the DD(X) program, see CRS Report RS21059, *Navy DD(X) Future Surface Combatant Program: Background and Issues for Congress*, by Ronald O'Rourke. Washington, 2002. (Updated periodically) 6 p.

[11] For more on the SSGN 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.

[12] For a discussion of the Navy's efforts regarding electric-drive propulsion and integrated power 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.

forces were envisioned as constituting 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 smaller Littoral Combat Ship (LCS) as part of its DD(X) family of future surface combatants appears to be an outgrowth of the Streetfighter project.

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 support the need for transformation, but argue that funding demands for transformation need to be balanced against funding demands for readiness and for near-term procurement.

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.

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.[13]

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, as some critics argue they are. Other options would be to create a

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[13] For additional discussions of options for implementing naval transformation, see Work, Robert O. *The Challenge of Maritime Transformation: Is Bigger Better?* Washington, 2002. (Center for Strategic and Budgetary Assessments) 155 p.; O'Rourke, Ronald. Transformation and the Navy's Tough Choices Ahead: What Are the Options for Policymakers? *Naval War College Review*, Winter 2001.

standing naval experimental force for testing new ideas without diverting regular Navy forces from their primary missions.

Unmanned vehicles/netted sensors. An additional option would be to expand and accelerate the Navy's current efforts for UAVs, UCAVs, UUVs, and netted sensors. This could involve, among other things, developing more fully a recent Naval Postgraduate School proposal for a small aircraft carrier, called Sea Archer, that would carry about 16 UAVs and UCAVs. As of 2001, 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 crewing and deployment-cycle concepts. Another option would be to accelerate the Navy's efforts to institute innovative crewing and deployment-cycle concepts. A recent CBO report discussed how such concepts might be used on Navy attack submarines.[14]

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 (i.e., the basic types and combinations of Navy ships and aircraft). The current fleet architecture 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 with more urgency and funding programs for submarine-deployed UUVs and UAVs and 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.

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[14] U.S. Congress. Congressional Budget Office. *Increasing the Mission Capability of the Attack Submarine Force*. Washington, 2002. (A CBO Study, March 2002) 41 p.