Naval Transformation: Prospects and Implications

Peter J. Dombrowski
Strategic Research Department
Center for Naval Warfare Studies
Naval War College

and

Andrew L. Ross
Strategic Research Department
Center for Naval Warfare Studies
Naval War College

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The U.S. military is awash in visions of transformation. An array of glossy joint and service visions of what has become known as the "military after next" have been produced. Service transformation "roadmaps" have been developed. War games and experiments have been employed by the Department of Defense, the Joint Staff and joint commands, and the services in an effort to "validate" their visions. Analysts inside and outside of the military have opined about the emergent Revolution in Military Affairs (RMA). The rhetoric of "revolution" and, somewhat less radically, of "transformation" is ubiquitous. It remains to be seen, however, whether any of the multitude of "visions" will be translated into reality.

*Joint Vision 2020*, as *Joint Vision 2010* before it, foresees a military that dominates the full spectrum of military operations, from low intensity conflict to major regional contingencies (MRCs), in new ways. Information superiority is to be the source of dominant maneuver, precision engagement, focused logistics, and full dimensional protection. The Army's transformation project, complete with a "Vision," "Force XXI," and "Army After Next," is billed as the most significant change for the service since World War I. It promises to deliver an "Objective Force" that will be responsive, deployable, agile, versatile, lethal, survivable, and sustainable. The Air Force, which,

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like the Army, has belatedly discovered that it must be an expeditionary force,\(^5\) in its own

**Vision 2020** promises to deliver "Global Vigilance, Reach & Power" by fielding a full

spectrum aerospace force to control and exploit not only the air but also space.\(^6\) The

proposed force will employ "… aerospace capabilities to find, fix, assess, track, target, and

engage any object of military significance on or above the surface of the Earth in near real time."\(^7\) For the Navy, Network-Centric Warfare (NCW), explicitly advertised as a vision of warfare for the information age, is to guide the transformation of today's

Navy into the Navy after next. Resting upon the "supporting concepts" of information and knowledge advantage, assured battlespace access, effects-based operations, and forward sea-based forces, the Navy's exploitation of information technologies is to result in a "shift from platform-centric operations to Network Centric Operations."\(^8\)

In this paper we examine one specific vision of transformation, the Navy's concept of Network-Centric Warfare. We provide the context for our exploration of the Navy transformation case by first reviewing the Bush administration's approach to transformation. In the second section of the paper, we turn to Network-Centric Warfare.

\(^5\) The Marine Corps, on the other hand, has always recognized that it is an expeditionary force. In **Marine Corps Strategy 21** it bills itself as "the premiere 'total force in readiness.'" Headquarters, United States Marine Corps, **Marine Corps Strategy 21**, Washington, DC, November 2000. Available at [http://www.usmc.mil/templateml.nsf/25241abbb036b230852569c4004eff0e/$FILE/strategy.pdf](http://www.usmc.mil/templateml.nsf/25241abbb036b230852569c4004eff0e/$FILE/strategy.pdf).

\(^6\) The USAF **Vision 2020** can be found at [http://www.af.mil/vision/](http://www.af.mil/vision/).


A preliminary assessment of Network-Centric Warfare is provided in the final two sections. Our intent is twofold: (1) to evaluate the prospects for naval transformation and, by implication, the more general phenomena of U.S. military transformation; and (2) to begin to sketch out the implications of contemporary transformation for analytical debates on the nature of military innovation.

Military Transformation and the Bush Administration

In 2001, with the transformation debate already in full swing, the stakes were raised. The Bush administration took office proclaiming its commitment to transformation. Military transformation had emerged as an article of faith for the Bush team during the presidential campaign. In his September 1999 Citadel speech, then-Governor Bush called for "...creating the military of the next century," seizing the opportunity "...created by a revolution in the technology of war" skipping "... a generation of technology," and encouraging "... a new spirit of innovation."9

Early in his tenure, in the course of remarks at the Joint Forces Command on February 14, 2001, the new President returned to the themes of his Citadel address:

"We are witnessing a revolution in the technology [of] war. Power is increasingly defined not by size, but by mobility and swiftness. Advantage increasingly comes from information.... Our goal is to move beyond marginal improvements to harness new technologies that will support a new strategy.... On land, heavy forces will be lighter. Our light forces will be more lethal.... In the air, we'll be able to strike across the world with pinpoint accuracy, using both aircraft and unmanned systems. On the oceans, we'll connect information and weapons in new ways, maximizing our ability to project power over land."10

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Even before the President delivered these remarks, Secretary Rumsfeld tapped Andrew W. Marshall, the Director of Net Assessment and a longtime proponent of, and true believer in, transformation, to lead a comprehensive review of U.S. defense strategy. Other panels were established to focus on transformation, conventional forces, nuclear forces, missile defense, space, crisis response, acquisition reform, and quality of life, among other issues. Subsequently, the Office of Force Transformation (OFT), lead by VADM Arthur Cebrowski, USN (Ret), a leading advocate of NCW, was established; the services were directed by the Office of the Secretary of Defense (OSD) to develop transformation roadmaps; and, most recently, a Defense Transformation Guidance was developed to accompany OSD’s Defense Planning Guidance.

The Bush administration's commitment to transformation was formalized in DoD's September 2001 *Quadrennial Defense Review Report*. Even as the events of 11 September signaled the onset of the global war on terror, the President and his senior leadership continued to emphasize the importance of "the transformation of U.S. forces, capabilities, and institutions." Transformation was once again proclaimed to be "at the heart" of the administration's "new strategic approach." Indeed, a renewed sense of urgency was conveyed: "Transformation is not a goal for tomorrow, but an endeavor that must be embraced in earnest today." Four transformation pillars—(1) joint operations;
(2) experimentation; (3) intelligence; and (4) research and development and selective recapitalization—and a set of "six critical operational goals" were identified.\textsuperscript{16}

The most prominent dimensions of transformation—technology, doctrine, and organization\textsuperscript{17}—were evident in the characterization of transformation provided in the 2001 QDR:

Transformation results from the exploitation of new approaches to operational concepts and capabilities, the use of old and new technologies, and new forms of organization that more effectively anticipate new or still emerging strategic and operational challenges and opportunities and that render previous methods of conducting war obsolete or subordinate. Transformation can involve fundamental change in the form of military operations, as well as potential change in their scale. It can encompass the displacement of one form of war with another, such as fundamental change in the ways war is waged in the air, on land and at sea. It can also involve the emergence of new kinds of war, such as armed conflict in new dimensions of the battlespace.\textsuperscript{18}

This characterization of transformation suggests that remaking the armed forces requires more than routine, sustaining innovation. Transformation entails, as the 2002 Annual Report explicitly recognized, "discontinuous change."\textsuperscript{19} Disruptive innovation—as suggested by (1) the QDR's use of RMA language; (2) its discussion of transformation's "social" dimensions; and (3) its recognition of the necessity for "fundamental changes… in organizational culture and behavior"\textsuperscript{20}—is apparently in the offing as well.\textsuperscript{21}

The Clinton administration's "balanced," Goldilocks and the Three Bears approach to transformation, evident in its 1997 QDR, had seemingly been rejected by the...
new administration. Instead, it appeared to have embraced the approach of the National Defense Panel, which in its critique of the 1997 QDR called for "Transforming the armed forces into a very different kind of military from that which exists today," for according ". . . the highest priority to executing a transformation strategy," and for accelerating transformation. Future readiness, apparently, was now to be accorded a higher priority than current readiness.

Transformation, clearly, is a high priority for the Bush administration. Its commitment to transformation may even exceed that exhibited by the military itself. Transformation has been elevated to the top of the defense planning agenda, despite internal arguments that the military should focus on current readiness, the recapitalization and modernization of existing forces, and the prosecution of the global war on terror. Against this backdrop, the U.S. Navy has struggled to turn the concept of Network-Centric warfare, first developed under the stewardship of then-Vice Admiral Arthur Cebrowski, USN, from an abstract exercise in strategic thinking into a full-fledged plan for naval transformation.

The Naval Transformation Case: Network-Centric Warfare

Network-Centric Warfare provides an useful vehicle for exploring military transformation more generally. At least as much as other service visions, NCW is broadly representative of military transformation. Along with Joint Vision 2020 and the visions of the other services, NCW emphasizes the need to bring the U.S. military into the information age. New commercial information technologies are to be applied to

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military tasks. Information technology (IT) is thus viewed as central to the transformation enterprise; it enables the realization of prized capabilities such as precision strike and a "common operational picture." Moreover, NCW is inherently joint; the Navy cannot implement it in isolation from the other services. Indeed, NCW concepts are embedded in Joint Vision 2020. It is the essence of "information superiority," the key to Joint Vision 2020. Exploring NCW, using it as our visionary touchstone and point of departure, therefore, will reveal much about the broader military transformation enterprise.

According to its proponents, Network-Centric Warfare represents an emerging vision of the future of war. That vision is driven by a particular understanding of the transformation of modern society from the industrial age to a post-industrial or information age at the beginning of the twenty-first century. Advances in information technologies that have resulted in widespread socio-economic changes will also revolutionize the conduct, if not the nature, of war. In particular, the increasing use of

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23 NCW proponents include Vice Admiral Arthur Cebrowski, the former President of the Naval War College and now Director of DoD's Office of Force Transformation, and the concept developers at the Navy Warfare Development Command (NWDC).


networks for organizing human activities is touted as a means for reshaping the way American forces train, organize, equip, and fight.26

In brief, networks harness the power of geographically dispersed nodes (whether personal computers, delivery trucks, or warships) by linking them together into networks (such as the World Wide Web) that allow for the extremely rapid, high volume transmission of digitized data (multimedia). Networking has the potential to exponentially increase the capabilities of individual nodes or groups of nodes and to facilitate the efficient use of resources. When networked, individual nodes have access not only to their own resident capabilities but also, more importantly, to capabilities distributed across the network. The loss of a networked node need not be crippling; its functions can and will be assumed by other nodes in a robust network. Since networked

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nodes can share information efficiently, they can be designed as simple, low-cost adjuncts to the network itself.\textsuperscript{27}

The United States armed forces have been developing, initially by serendipity but increasingly by design, the capabilities for Network-Centric Operations (NCO).\textsuperscript{28} In a draft of a capstone concept paper, the NWDC identified four NCO “pillars,” or supporting concepts: information and knowledge advantage, effects-based operations, assured access, and "forward sea-based forces" [sic].\textsuperscript{29} (See Figure 1.)

\textsuperscript{27} Not all nodes, of course, are created equal. Some are more complex and, therefore, more expensive than others. The point is that networked nodes should be simpler and lower cost than stand-alone nodes.

\textsuperscript{28} There is as yet no “official” Navy document or statement that describes NCW. Indeed, there is no real consensus among its proponents about precisely what NCW is or entails. Its proponents charitably view NCW as a dynamic, living, evolving concept. Skeptics are more inclined to characterize NCW as a moving target riddled with ambiguities and informed by dubious analogies. In a definition attributed to John Gartska, NCW is “Warfare which harnesses information technologies in the form of global sensor, connectivity, and engagement grids to achieve a common operational picture that will lead to self-synchronization, massed effects, and the desired lock-out of a given enemy’s courses of action.” See Robert Odell, Bruce Wald, Lyntis Beard, with Jack Batzler and Michael Loescher, Taking Forward the Navy’s Network-Centric Warfare Concept: Final Report, CRM 99-42.10 (Alexandria, VA: Center for Naval Analyses, May, 1999), p. 11. The Naval Studies Board’s Committee on Network-Centric Naval Forces defined network-centric operations as “military operations that exploit state-of-the-art information and networking technology to integrate widely dispersed human decision makers, situational and targeting sensors, and forces and weapons into a highly adaptive, comprehensive system to achieve unprecedented mission effectiveness.” Committee on Network-Centric Naval Forces, Naval Studies Board, Network-Centric Naval Forces, p. 12. The Naval Warfare Development Command described NCO as “deriving power from the rapid and robust networking of well-informed, geographically dispersed warfighters. They create overpowering tempo and a precise, agile style of maneuver warfare.” Navy Warfare Development Command, Network Centric Operations: A Capstone Concept for Naval Operations in the Information Age (Newport, RI: Naval Warfare Development Command, draft dated 6/19/01), p. 1. Available at http://www.nwdc.navy.mil/Concepts/capstone_concept.asp.

\textsuperscript{29} Navy Warfare Development Command, Network Centric Operations: A Capstone Concept for Naval Operations in the Information Age. What NWDC terms “forward sea-based forces” we call “forward-deployed sea forces.” It is not clear that these forces will actually be based at sea.
Network Centric Operations

Warfare deriving power from robust rapid networking of well-informed geographically dispersed forces

- Warfare Not Hardware
- Networked Warfighters Not Just Nets
- Real-Time Shared Knowledge
- Dispersed Forces/ Concentrated, High Volume Effects
- Integrates Surveillance, Strike and Maneuver

Effects-Based Operations

Information and Knowledge Advantage

Assured Access
Fwd Sea-Based Forces

Dominate Tempo and Foreclose Enemy Options
Agile, Anticipatory Operations Using High Rates of Change to Shock the Enemy and Lock Out His Options

Figure 1


The postulated benefits of NCO provided by the pillars of information and knowledge advantage and effects-based operations include speed of command, self-synchronization, advanced targeting, and greater tactical stability. Netted sensors are to provide shooters and commanders with "unmatched awareness of the battle space." Within the battlespace, warfighters are to be able to "self-synchronize" their activities to accomplish a commander's intent by drawing upon a shared "rule set—or doctrine" and a common operational picture (COP). In essence, self-synchronization is accomplished by devolving decision-making downward to the lowest appropriate level, thus allowing warfighters to respond directly and quickly to tactical, operational, and

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even strategic challenges. Fires are to be employed in effects-based operations (EBO) rather than in attrition-based warfare. Precision guided munitions in conjunction with advanced intelligence, surveillance, and reconnaissance (ISR) capabilities will allow targets to be hit with greater economy—simultaneously rather than sequentially—greatly increasing the possibility of imposing disproportionate effects, particularly psychological effects, on the adversary. Tactical operations may thus achieve strategic objectives.

Finally, by geographically dispersing sensors, shooters, and their supporting infrastructure within an overarching network, U.S. forces will be able to achieve greater tactical stability—a favorable balance between survivability and combat power.\(^{34}\) Fires, rather than forces, will be massed and delivered beyond visual range. Ideally, EBO, fueled by information and knowledge superiority, will enable U.S. forces to "lock in success and lock out enemy solutions" and options.\(^{35}\) Smaller, lighter, faster, less complex, and less expensive nodes (i.e., platforms) linked by interoperable, highly redundant, self-healing networks will present adversaries with fewer high value targets and improve the robustness of operations against a determined foe.

Implicitly at least, NCO is a joint vision that harnesses capabilities from all services; it is applicable to warfare on land, air, or sea.\(^{36}\) That NCO is a Navy concept with naval origins, however, is evident in the two pillars that are more distinctly naval:

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\(^{34}\) Ibid. p. 11.

\(^{35}\) Ibid. p. 10.

assured access and forward-deployed sea forces. Assured access\textsuperscript{37} refers to the ability of the U.S. armed forces to gain entry to and use both overseas infrastructure, such as ports and airfields, and the battlespace itself, even when confronted with a capable and hostile adversary.\textsuperscript{38} No sanctuary is to be ceded to the adversary. It is the job of the Navy and the Marine Corps to enable and ensure access by follow-on forces from the Air Force and the Army—the heavier forces necessary to fight and win major regional contingencies. The Navy accomplishes this through the combat capabilities inherent in its forward-deployed presence assets (i.e., the ability to operate in the littoral).\textsuperscript{39} Since sea-based forces “do not rely on permissive access to foreign shore installations that may be withdrawn or curtailed,” they “furnish an assured infrastructure for additional joint forces.”\textsuperscript{40}

With its Capabilities of the Navy After Next (CNAN) project, the Naval Warfare Development Command has sought to determine what technologies, weapons, platforms, and systems are required by the Fleet to enable NCO. The principal "enabling element" of NCO is a set of information, sensor, and engagement grids (pictured in Figure 2) capable of linking all elements of the network with each other and with the wider information back plane that constitutes the World Wide Web and DoD-specific networks. This is not a single network but a network of networks, "a global grid of multiple, interoperable, overlapping sensor, engagement, and command nets."\textsuperscript{41} NCO relies greatly on the development and deployment of large numbers of more capable sensors to

\textsuperscript{37} On assured access see http://www.nwdc.navy.mil/Concepts/AA.asp.
\textsuperscript{38} Navy Warfare Development Command, Network Centric Operations: A Capstone Concept for Naval Operations in the Information Age, p. 10.
\textsuperscript{39} On forward sea-based forces see http://www.nwdc.navy.mil/Concepts/FSBF.asp.
\textsuperscript{40} Ibid. pp. 4-5.
\textsuperscript{41} Ibid. p. 6.
populate the sensor grid and provide a common operational picture. Sensors are to be ubiquitous.

**Figure 2**
**NCW Grids**

![NCW Grids](http://spica.or.nps.navy.mil/netusw)

Source: [http://spica.or.nps.navy.mil/netusw](http://spica.or.nps.navy.mil/netusw)

Among existing programs, as illustrated in Figure 3, the Cooperative Engagement Capability (CEC), IT-21, the Radar Modernization Program (RMP), the Web Centric Anti-Submarine Warfare Net (WeCAN), and the Navy-Marine Corps Intranet (NMCI) will help the Navy evolve further towards the ability to conduct NCO. According to the NWDC, a critical future step is the deployment of a multi-tiered—space, air, surface/ground and undersea—expeditionary sensor grid (ESG) combining, among other things, invasive sensing systems, unmanned platforms, massively distributed information

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systems, and computer network attack and defense capabilities.\textsuperscript{43} At its simplest, the ESG is a "toolbox of sensors and networks necessary to build… real-time battlespace awareness."\textsuperscript{44}

**Figure 3**

![The Information Grid -- Detailed View](http://spica.or.nps.navy.mil/netusw/CebrowskiNetWar/sld005.htm)

The most robust form of NCW also features smaller, lighter, faster, less complex platforms (nodes) of all types. This includes unmanned vehicles to deploy sensors or to serve as sensors, communications relays, and/or weapons platforms. Perhaps the most significant platform issue from a naval standpoint, however, is whether NCW requires innovative design concepts such as small littoral combatants (formerly known as Streetfighter), fast lift, and small-deck aircraft carriers. In the view of its most fervent...

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\textsuperscript{44} Navy Warfare Development Command, *The Expeditionary Sensor Grid: Gaining Real-Time Battlespace Awareness in Support of Information and Knowledge Advantage*, Post-Workshop Draft, 06/19/01, p. 3.
advocates, fulfilling the ultimate promise of NCO requires smaller, lighter, faster, less complex, and less expensive nodes/platforms that will facilitate self-synchronization, swarming tactics, and greater tactical survivability. Complexity is located on the web rather than on the node; the complex, expensive platform nodes that populate the legacy force will be displaced by simpler, less expensive nodes. In today's Navy, existing platforms are being networked via, for instance, CEC and IT-21. In the future's network-centric Navy, nodes will be tailored to network requirements from their earliest conception.

In the spring of 2002, "FORCEnet," as portrayed in the Naval Transformation Roadmap (NTR), was introduced as the Navy's framework for implementing NCW.\(^{45}\) Originally developed by the CNO's Strategic Studies Group, FORCEnet has been billed variously, and often contradictorily, as putting the "Warfare" in Network-Centric Warfare and as "the next generation of NCW." Perhaps the most common interpretation is that FORCEnet will allow progress toward implementing the NCW vision by providing an architecture for integrating its components: network systems, sensors, decision aids, weapons, platforms, people, and infrastructure.

Admiral Vernon Clark's SEA POWER 21 (SP 21) draws upon both network-centric concepts and FORCEnet. He argues that the Navy of the 21st century should provide future Sea Strike offensive capabilities, Sea Shield defensive capabilities, and Sea Basing "persistent presence" capabilities.\(^{46}\) To achieve these overarching goals, the


NTR’s three sets of nine transformational warfighting capabilities (see Table 1 below) are to be developed in a phased process from 2002-2020.\textsuperscript{47} FORCEnet serves as an umbrella both for existing programs such as the Navy-Marine Corps Intranet (NMCI), IT-21, CEC, and NFN and for major future programs such as the Expeditionary Command and Control, Communications, Computers, and Combat Systems Grid (EC5G) and the Expeditionary Sensor Grid (see Figure 4).\textsuperscript{48}

\begin{table}
\centering
\caption{The NTR’s Nine Transformational Warfighting Capabilities}
\begin{tabular}{l}
\textbf{Sea Strike} \\
\hspace{1em} Time persistent ISR \\
\hspace{1em} Sensitive Strike \\
\hspace{1em} Offensive information operations \\
\hspace{1em} Ship-to-objective maneuver \\
\textbf{Sea Shield} \\
\hspace{1em} Theater air and missile defense \\
\hspace{1em} Littoral sea control \\
\hspace{1em} Homeland defense \\
\textbf{Sea Basing} \\
\hspace{1em} Compressed deployment and employment time \\
\hspace{1em} Enhanced sea-borne positioning of joint assets
\end{tabular}
\end{table}

\textit{Source: Naval Transformation Roadmap: Power and Access...From the Sea} (Washington, DC: Department of the Navy, 2002).

\textsuperscript{47} During the first phase, 2002-2004, the focus will be on improving networks, sensors, people, and weapons, with networks and sensors the highest priority. People and infrastructure will be accorded highest priority during the second stage, 2004-2010, and platform and infrastructure improvements are to be added to the agenda. Platform and infrastructure improvements join the list of high priority efforts during the third stage, 2010-2020.

\textsuperscript{48} A FORCEnet office directed by VADM Dennis McGinn, USN, Deputy Chief of Naval Operations (N6/N7 Warfare Requirements and Programs) was established in OPNAV; in July 2002 the Naval Network Warfare Command (NETWARCOM) was stood up at the Little Creek Naval Amphibious Base.
With the promulgation of SEA POWER 21, FORCEnet, and the NTR, network centric concepts are firmly embedded in the official version of naval transformation. It remains to be seen, however, whether naval transformation will fulfill the overarching vision of transformation suggested by Joint Vision 2020 and Bush administration defense planning documents.

Naval Transformation: Does it Measure Up?

Judged against the standards established, and the expectations created, by President Bush, the administration's 2001 QDR, and its first Annual Report, the naval transformation enterprise falls short, even if—and this is a big if—it is fully implemented in the coming decades. Neither the next Navy of 2010 nor the Navy after next of 2020
will be the old Navy; but they will be recognizable. Operational capabilities are unlikely
to have been transformed; instead, capabilities resident in the current Navy will be
improved.

The Navy advertises SEA POWER 21 as a "new operational construct;" in reality,
SP 21 is merely a repackaging of familiar ideas. The Navy has long possessed offensive,
defensive, and presence capabilities. Relabeled Sea Strike, Sea Shield and Sea Basing,
those capabilities will continue to be enhanced, or modernized, but not revolutionized.
The "new operational construct" essentially calls for more of the same: routine,
sustaining modernization. Some critics have even suggested that the version of naval
transformation presented in SEA POWER 21 amounts to little more than employing
"sea" as an adjective (in addition to Sea Strike, Sea Shield, and Sea Basing, SP 21
provides us with Sea Trial, Sea Warrior, and Sea Enterprise—covering terms for,
respectively, experimentation, personnel development, and organizational process
improvements).

Unfortunately for naval transformation proponents, a similar judgment can be
rendered against Network Centric Operations, the Navy Warfare Development
Command's operational concept for NCW. At the most basic level, the desirability of the
information and knowledge advantages hyped by NCO is not new. Military commanders
since time immemorial have sought more and better quality information.49 As for effects
based operations, the Navy, and indeed all branches of the military, have always sought
to take out targets with an eye toward their effects on enemy forces. Assuring access too
is not a novel operational concept. The Navy has long sought to ensure battlespace
access for other components of the total force. It has also long been the provider of

"forward sea-based forces." Dominating the tempo of war and foreclosing adversary options is a central, and traditional, warfighting objective. How all of this is to be done will be improved, but not revolutionized.

The Navy, and the other services as well, is not new to the information age. NCO builds upon existing Navy IT capabilities and programs. Few if any of the capabilities it envisioned entail skipping a generation of technology. It incorporates and builds upon current network capabilities and programs to enhance future connectivity. Routine, sustaining innovation is likely to continue to be the norm. Tellingly, the performance metrics of the nodes, or platforms, and networks envisioned by NCW and NCO require less discontinuous and disruptive innovation than sustaining innovation.\(^{50}\)

According to the NTR, the objective of naval transformation is "to achieve a broad, sustained and decisive military competitive advantage over existing or potential adversaries."\(^{51}\) The USN, however, already possesses that competitive advantage. It is the world's preeminent naval force. It now exercises virtually unchallenged command of the seas and possesses unrivalled power projection capabilities. There is nobody in the rearview mirror. That preserving and extending the USN's preeminence requires "… substantially extending boundaries of necessary military competencies and… discovering fundamentally new approaches to military operations"\(^ {52}\) remains to be demonstrated.

The sense of urgency attached to transformation by the President, the 2001 QDR, and the 2002 Annual Report is little evident in the NTR and other Navy planning documents. For the Navy, it seems, transformation means business as usual:

\(^{50}\) See Peter Dombrowski, Andrew L. Ross, and Eugene Gholz "Selling Transformation: The Defense Industrial Sources of Sustaining and Disruptive Innovation," *Orbis*, Vol. 46, No. 3 (Summer 2002), pp. 523-536  
\(^{51}\) *Naval Transformation Roadmap*, p. 6.  
\(^{52}\) *Naval Transformation Roadmap*, p. 6.
incremental, evolutionary changes in both capabilities and the doctrine necessary to employ those capabilities. The NTR, in particular, features rampant incrementalism. It is replete with calls for "more effectively" utilizing and exploiting assets; for enhancing, increasing, improving (occasionally significantly), and leveraging existing capabilities; and for accelerating current programs.

Few programs have been canceled to free up resources for transformation. Instead, existing Navy programs are billed as transformational. The alignment of programs and resources with the Navy transformation vision and roadmap is far from seamless. Programs remain platform- rather than network-centric. Science and technology and research and development programs remain focused more on near-term technology transition to the fleet than on the long-term basic S&T/R&D that some believe is required for transformation. Routine, sustaining modernization and the recapitalization of legacy systems overshadow programs that could yield disruptive innovation.

To date, naval transformation is a rather modest enterprise. The Navy transformation effort is virtually indistinguishable from routine modernization. At best, it amounts to "modernization plus." It emphasizes sustaining innovation and incremental, evolutionary change.53 Baring unforeseen developments, the Navy will continue to do what it does now, only better.

The Navy's measured, incremental, evolutionary approach to transformation and its continued reliance upon threat-based planning is not entirely out of sync with OSD's approach. The urgency attached to transformation, the emphasis on discontinuous, even

53 Particularly revealing is the Navy's treatment of transformation in its Highlights of the Department of the Navy FY 2003 Budget, where the only sustained discussion of transformation appears in Section III, "Recapitalization."
disruptive, change, and the ascendance of capabilities-based planning evident in the QDR and the 2002 *Annual Report* are not absolute. It is recognized that transformation is a long-term process; its promise will only be fully realized over time.54 "Today's challenges" must be addressed even while the military is transforming for the future; future readiness is not to be ensured at the expense of current readiness.55 Prudence and balance are ever the watchwords: "it would be imprudent to transform the entire force all at once. A balance must be struck between the need to meet current threats while transforming the force over time."56 This appeal to prudence and balance is unlikely to result in a rush to transformation.

The Transformation Imperative

The military's declared intent to remake itself, and the Bush administration's oft-stated commitment to military transformation, raises an obvious question: what drives the quest for innovation? The answer to this question is not obvious. There is no single country or even group of countries poised to challenge American military supremacy in the immediate future. The cold war is over; the principal U.S. rival of the past, the Soviet Union, is defunct. There is ample evidence that the U.S. military is by far the most potent armed force in the world. In conflicts from the Balkans and the Persian Gulf to the current campaign in Afghanistan, the U.S. military has achieved its battlefield objectives with maximum speed and a minimum of casualties. No great power competitors appear

56 *Quadrennial Defense Review Report*, p. 16. And on pp. 47 and 48: "This transformation will be conducted in a timely but prudent manner. In particular, prudence dictates that those legacy forces critical to DoD's ability to defeat current threats must be sustained as transformation occurs.... DoD must overcome trends of the past to sustain a balanced defense program that maintains near-term readiness without mortgaging the long-term capabilities of the force."
ready to challenge the United States. The most sophisticated, if not necessarily the largest, militaries in the world belong to U.S. allies or countries little inclined to challenge the United States. And fighting and winning the global war on terror does not require transformation.

**Transformation and Defense Planning**

In an idealized, or stylized, view of the military planning process, it might be assumed that a drive for transformation would be based upon a broad-ranging net assessment of future challenges and requirements. With the assistance of the intelligence community, planners would scan the horizon for adversaries and potential adversaries, assess their military potential, and determine the structure, capabilities, and size of the military needed to deter and, if necessary, fight and defeat possible enemies. Planners would also assess the current and likely future state of U.S. military forces in order to determine whether they are sufficient to meet the nation’s security needs. If existing military forces were insufficient or might conceivably weaken over time due to aging equipment, demographic trends or other considerations, planners would be expected to take steps to strengthen the armed services. Such steps could include increasing the size of the force, modernizing and/or recapitalizing weapons and systems, or acquiring different types of forces.\(^{57}\)

Defense planners could also opt to fundamentally alter military technologies, doctrine, and organizational structures—in short, to transform the military or even generate a home-grown revolution in military affairs.

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\(^{57}\) Planners should never lose sight of non-military strategic adjustments such as acquiring new allies or shedding past partners. Alternatively, non-military instruments such as diplomacy, economic statecraft and the like can ease the burden placed on the military for protecting the nation into the future.
Threat-Based Planning. A threat-driven approach to force planning focuses on a particular adversary (as, for example, the United States focused on the Soviet Union during the cold war) or, if circumstances or politics dictate, on a set of adversaries. During the post-cold war period, the United States prepared to fight two Major Regional Contingencies (MRCs), or Major Theater Wars (MTWs), simultaneously (or near-simultaneously). Barely disguised was the fact that planning efforts generally looked to Iraq and North Korea as the likely regional adversaries. Force structure and size, deployments, basing, and training were generally based upon exercises using illustrative planning scenarios and theater war plans developed for the particular geography and regional security environments of the Persian Gulf region and the Korean peninsula.

Throughout the 1990s, experts quarreled about whether the United States should be prepared (and was actually prepared) to fight two MRCs simultaneously or near-simultaneously.\(^5^8\) Planners grappled with the requirement for fighting MRCs at the same time that military forces are engaged in smaller contingencies such as peacekeeping and/or humanitarian operations. While these distinctions matter greatly for the Army, the Marine Corps and the Air Force (in terms of the number of divisions and air wings that must be available and where they must be based or deployed) the dirty secret from the Navy’s perspective is that its own force structure requirements derived less from MRC/MTW requirements than from self-serving forward presence requirements.

Capabilities-Based Planning. A capabilities-based rather than a threat-based approach to force planning is featured in the transformation-yielding "paradigm shift"

touted by the Bush administration. The threat-driven approach of the past that focuses on
a particular adversary (the cold war focus on the Soviet Union) or adversaries (the post-
cold war focus on MRCs/MTWs) has been discarded in favor of a focus on "the growing
range of capabilities" that unspecified (not only unknown but also perhaps unknowable)
future state and non-state adversaries "might possess or could develop" and on the
corresponding capabilities U.S. forces will need to deter, fight, and win in the future.
This capabilities-based approach is to result in the development of a robust "portfolio of
capabilities" that can be employed across the spectrum of conflict in any geographical or
functional theater and is portrayed as requiring "... the United States to focus on
emerging opportunities" that, apparently, would otherwise be foregone or overlooked.

The Naval Transformation Roadmap pays lip service, but little more, to the
allegedly paradigm-busting approach of capabilities-based force planning. It is very
much informed by a range of traditional and non-traditional threats. The threat-based
planning of old is alive and kicking. Threats exist that must be deterred by naval forces.
Command of the seas "provides the springboard for the decisive defeat of any adversary."
Power projection "helps to deter threats" and "to disrupt or destroy hostile forces."
"Threats to the homeland" are to be deterred, detected, and interdicted by "forward-
deployed naval forces." Terrorists are explicitly singled out for attention in the
discussion of homeland security. Sea Shield entails the defeat of "area denial threats
including aircraft, missiles, small littoral surface combatants, mines and submarines."

Theater air and missile defense (TAMD) capabilities would not be required in the

opportunities" is left unclear.
61 NTR, pp. 7-8.
62 Ibid., p. 17.
absence of ballistic and cruise missile threats. "[S]mall, fast surface combatants, quiet
diesel submarines and sea mines" are also explicitly identified as threats. In the absence
of significant current and future threats, there would not be a requirement for Sea Strike,
Sea Shield, and Sea Basing. Force planning, naval or otherwise, cannot be solely
capabilities-driven. Planners cannot know what capabilities will be required without
determining what threats may be encountered.

Threats are also prominently on display in the QDR and the 2002 Annual
Report—despite the asserted ascendance of capabilities-based force planning. According
to the QDR, "an increasing number of states will acquire ballistic missiles with steadily
increasing effective ranges." The 2002 Annual Report identifies three evil countries that
"are arming with long-range missiles and are seeking or acquiring nuclear, biological,
and chemical (NBC) weapons": Iraq, Iran, and North Korea. The QDR's survey of the
"Changed Security Environment" highlights Asia's "volatile mix of rising and declining
regional powers," the "radical or extremist internal political forces or movements" that
threaten some of those powers, and "the possibility… that a military competitor with a
formidable base will emerge in the region." In the Middle East, "several states pose
conventional military challenges and many seek to acquire—or have acquired—chemical,
biological, radiological, nuclear, and enhanced high explosive (CBRNE) weapons." The
2002 Annual Report explicitly identifies Iran and Iraq as two Middle Eastern states
engaged in such activities. Noted as well in the QDR are the danger of Western

63 Ibid., p. 19.
64 Quadrennial Defense Review Report, p. 3.
65 Annual Report, p. 12.
67 Quadrennial Defense Review Report, p. 4
68 Annual Report, p. 12.
hemisphere crises or insurgencies, the "increasing challenges and threats emanating from the territories of weak and failing states" (drug trafficking and terrorism, for instance) and the "diffusion of power and military capabilities to non-state actors," particularly terrorists.69

Despite the Bush administration's claim to have abandoned threat-based planning for capabilities-based planning, its 2001 QDR and its first Annual Report make ample use of threats emanating from quite predictable places. Neither approach, however, dictates transformation. Indeed, there is little, if anything, inherent in contemporary planning approaches that argues convincingly for military transformation. The origins of military transformation must be sought elsewhere.

Technological Opportunism?

If transformation is not a product of contemporary defense planning approaches, what is driving the push for technological, doctrinal and organization innovation? One intriguing possibility is the presence of technological push. By this argument, military and civilian transformation proponents have been seduced by the promise of information age technologies. After all, much of the economic boom of the 1990s (particularly, that associated with the "new economy") was fueled by developments in the information technology sector. Even more significant are the changes evident in numerous aspects of daily life, from the widespread adaptation of information and telecommunications technologies in the home to vast changes in the nature of the workplace (for example, "paperless" offices, business to business e-commerce, and "New-Old" economy firms).

As microchips became cheaper they were embedded everywhere (from automobile

69 Quadrennial Defense Review Report, p. 5.
engines to toaster ovens), thus increasing capabilities and, in some cases, dropping prices. Telecommunications advances had similar effects—the internet became less expensive, accessible and easy to use; cellular phones became ubiquitous; and digital media overwhelmed popular culture. Business journalists and media flaks assured the public that the new economy was fundamentally transforming the nature of markets and society’s relationship to technology.

To military officers operating systems with IT components several generations out of date, the possibility of introducing more modern information and technologies into the force seemed promising. In the case of naval transformation there is ample anecdotal evidence for the role played by technological opportunism. Then-Vice Admiral Arthur Cebrowski was fond of admiring the technological cycle times of Silicon Valley firms and referencing "Moore's Law" about advances in computer processing power. He circulated amongst his staff and students at the Naval War College books like Kevin Kelly's *New Rules for the New Economy: 10 Radical Strategies for a Connected World* that purported to explain the origins and implications of the information age. In his written work, Admiral Cebrowski and his co-authors drew upon business analogies and examples from the retailing strategies of Wal-Mart to the trading practices of securities firms.

For transformation advocates the problem was often less convincing the rest of the military that there was as Brave New World in the commercial technology sectors than determining how such technologies might be adapted to warfare. Network-Centric

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Warfare with its emphasis on the determining roles of information and communication in the battlespace provided just such a rationale. Once a strong deductive case could be made for an IT RMA, the problem became how to reform the acquisition system to accommodate more rapid cycle times. Acquisition regulations and other types of government requirements (export control laws, intellectual property rights, and the like) only served to impede the rapid adoption of emerging information technologies into the rapidly out-dated military. The solution to this problem was create a "revolution in business affairs" to complement and support military transformation.

In some respects, this technology push argument parallels aspects of the explanation for military technological innovation advanced by Evangelista. In the nuclear arms race between the United States and the Soviet Union, the strategic dynamic was less important in determining the nature of American military innovation than internal factors; as Evangelista put it, "a new weapon starts with a technological idea rather than a response to a specific threat or as a means to fulfill a long-standing mission." Only later, when it is necessary to justify new weapons to decision-makers and budgeteers, do external factors such as threat perceptions matter.

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73 Evangelista, p. x.
By analogy, the absence of threats in the post-cold war period (and concomitant debates over what types of planning approaches should be used) was less important to naval transformation advocates than the possibility that technological modernization could yield a more capable, less expensive force. In effect, it was argued that the systematic introduction of information age technologies would help the Navy overcome several of its most pressing problems: the need to maintain force structure (next generation platforms would be cheaper and therefore more numerous), to reduce casualties of both American soldiers and civilian non-combatants (weapons could be fired at greater distances with more accuracy from stealthier platforms), and to operate with fewer officers and enlisted personnel (automation would reduce the demand for sailors and force fewer of them into dangerous situations). When the time came to justify the expenditures necessary to achieve transformation objectives, threats could either be manufactured—the possible emergence of a peer competitor—or, failing that, the threat based-planning approach itself could be replaced.

"Conclusion"

What today passes for military transformation and, in particular, naval transformation is less revolutionary than their advocates imply and official rhetoric suggests. Under a best case scenario—where most if not all of the military embraces transformation, the resources necessary to implement transformation are readily available, and the technological challenges inherent in developing new capabilities are

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75 Among other differences from the framework elaborated by Evangelista, the current drive for naval transformation, especially on the technology side of the equation, came less from the in-house progress of the federal laboratories, naval systems commands or the naval industrial base than from outside the government entirely. The advances in nuclear weapons systems analyzed in innovation and the Arms Race were developed largely in federal facilities by government employees.
met—the Navy after Next will be simply a modernized version of the existing fleet. With the long-term presence of legacy systems and the modest goal of transforming 10-15 percent of the force, the Navy After Next will be an improved version of today's Navy. The prospects for discontinuous, disruptive change are slim.

The major exception to this generalization, in effect, proves the rule. Network Centric Operations proposes some novel ways to conduct naval operations: self-synchronization and "swarming," for instance. Yet, it is precisely against these concepts that much of the resistance to NCO has coalesced. War games that purport to "validate" swarming have been roundly criticized. Efforts to promote surface combat vessels that are smaller, faster, less complex, less expensive, and thus more numerous, have fallen on deaf ears. Resistance to replacing, or even supplementing, big-deck aircraft carriers with small-deck carriers, or perhaps eliminating carriers altogether, has been especially vociferous. Indeed, recent designs for the Littoral Combat Ship look less like the "Streetfighters" (which were to fight in "swarms") proposed by VADM Cebrowski than like modern frigates. Suggestions that the Navy no longer deploy in carrier battle groups (CVBGs) or amphibious ready groups (ARGs) have been roundly criticized.

Is the lack of real transformation a problem? Not especially. In our view, there is no compelling strategic rationale for transformation. Transformation is not required for the maintenance and extension of either U.S. military dominance specifically or U.S. primacy generally. Nor is it a requirement for fighting and winning the global war on terror. Generic capabilities designed to meet generic threats (as in capabilities-based planning) or old threats pumped up for a new millennium (as in threat-based planning
against an Iraqi or Korean foe) in the service of force protection will suffice in the
absence of a clear and present danger.