

Marine views demolition of weapons cache in Iraq from HEV Cougar, the Marine Corps' newest vehicle, wrapped in steel armor and ballistic glass



U.S. Marine Corps (Will Lathrop)

Getting Transformation Right

By RICHARD D. HOOKER, JR., H.R. McMASTER, and DAVE GREY

Today, as never before, the military establishment is committed to dynamic and revolutionary change to produce new forms of warfare and new warfighting capabilities. Transformation

offers an exciting vision of future war with fewer casualties, quicker victories, and a lower price tag. It could secure U.S. military dominance for generations to come. But there are risks. Getting transformation right is second only to success on the battlefield as the most important challenge facing the military.

Transformation plays to American strengths in technology and engineering, allays the fear of casualties, assumes

Colonel Richard D. Hooker, Jr., USA, is Commander, XVIII Airborne Corps Combat Support Brigade; Colonel H.R. McMaster, USA, is Commander, 3^d Cavalry Regiment, and author of *Dereliction of Duty*; and Colonel Dave Gray, USA, is Commander, 1st Brigade, 101st Airborne Division (Air Assault).

Report Documentation Page				Form Approved OMB No. 0704-0188	
Public reporting burden for the collection of information is estimated to average 1 hour per response, including the time for reviewing instructions, searching existing data sources, gathering and maintaining the data needed, and completing and reviewing the collection of information. Send comments regarding this burden estimate or any other aspect of this collection of information, including suggestions for reducing this burden, to Washington Headquarters Services, Directorate for Information Operations and Reports, 1215 Jefferson Davis Highway, Suite 1204, Arlington VA 22202-4302. Respondents should be aware that notwithstanding any other provision of law, no person shall be subject to a penalty for failing to comply with a collection of information if it does not display a currently valid OMB control number.					
1. REPORT DATE 2005		2. REPORT TYPE		3. DATES COVERED 00-00-2005 to 00-00-2005	
4. TITLE AND SUBTITLE Getting Transformation Right				5a. CONTRACT NUMBER	
				5b. GRANT NUMBER	
				5c. PROGRAM ELEMENT NUMBER	
6. AUTHOR(S)				5d. PROJECT NUMBER	
				5e. TASK NUMBER	
				5f. WORK UNIT NUMBER	
7. PERFORMING ORGANIZATION NAME(S) AND ADDRESS(ES) National Defense University, Institute for National Strategic Studies, 260 5th Avenue SW Fort Lesley J. McNair, Washington, DC, 20319				8. PERFORMING ORGANIZATION REPORT NUMBER	
9. SPONSORING/MONITORING AGENCY NAME(S) AND ADDRESS(ES)				10. SPONSOR/MONITOR'S ACRONYM(S)	
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)	
12. DISTRIBUTION/AVAILABILITY STATEMENT Approved for public release; distribution unlimited					
13. SUPPLEMENTARY NOTES					
14. ABSTRACT					
15. SUBJECT TERMS					
16. SECURITY CLASSIFICATION OF:			17. LIMITATION OF ABSTRACT Same as Report (SAR)	18. NUMBER OF PAGES 8	19a. NAME OF RESPONSIBLE PERSON
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified			

a reduced requirement for vulnerable ground troops, and promises short, sharp campaigns. It does not rely as heavily as current warfare on uncooperative allies. Theoretically, it could enhance deterrence through the prospect of decisive, overwhelming defeat of adversaries. There is a danger, however, in embracing the transformation agenda entirely without addressing its potential shortcomings.

The Power of the Microchip

What is meant by *transformation*? The Department of Defense Office of Force Transformation defines it somewhat elliptically as “a process that shapes the changing nature of military competition. . . . First and foremost,

defense transformation seeks to exploit the power of the microchip to control information

transformation is a continuing process. It does not have an end state.”¹ While clearly an ongoing procedure, the lack of precisely defined waypoints, operating parameters, a bounded and developed transformational concept for joint operations, or disciplined programmatic means that service and joint planners cannot easily prioritize programs and resources to satisfy what remains an ambiguous agenda. Many major programs predate the advent of force transformation by many years. They represent not the dramatic restructuring of military organizations and institutions in accordance with transformational concepts, but the continuation of Cold War programs originally conceived to cope with the Soviet threat and now repackaged as “transformational.”

In general terms, defense transformation seeks to exploit the power of the microchip to control information. Various described as *network-centric* or *effects-based* warfare, it focuses on the use of precision-guided munitions employed at standoff ranges—all networked to the same information grid—to defeat opponents in major

theater war and lesser contingencies. This approach emphasizes the use of high technology on future battlefields. The thrust is the exploitation of America’s edge in high technology to achieve rapid victory with smaller ground forces and fewer casualties. In this construct, networked, digitized intelligence and information systems can give a precise and uniform picture of the battlefield to commanders for immediate targeting and engagement.

Force transformation had its roots in the revolution in military affairs debates of the 1990s and gained a new level of interest after the 2000 Presidential election. This thinking was heavily influenced by business innovations and practices that exploited new information technologies to achieve business efficiencies. In many places, business strategies and jargon have been grafted wholesale into transformation documents, suggesting that armed conflict and the marketplace are somehow analogous if not equivalent. The intent was to apply business practices and emerging technologies to transform the Armed Forces from an industrial- to an information-focused military.

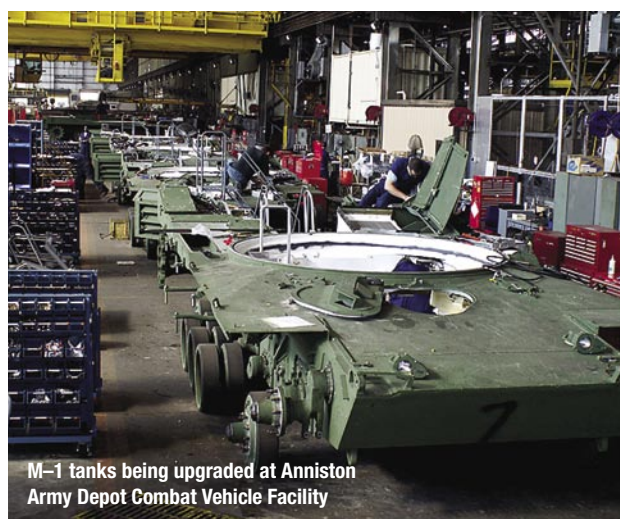
Today, transformation is focused on technology and the networked information grid. Human factors receive far less attention. Intellectually, transformation envisions an interconnected sensor grid able to pass information and intelligence instantaneously to firing platforms. In theory, this grid will provide full situational awareness to commanders, who can then select and attack the most critical and vulnerable target sets for maximum effect. Information superiority, enabled by systems that can seamlessly relay data from sensors to shooters, thus translates into faster decision cycles, forestalls enemy

reactions, creates more friendly options, and minimizes risks.

Beyond Theory

After several years, however, translating this general description of future war into detailed and specific systems and operating concepts—concrete capabilities placed in the hands of warfighters—has not progressed much beyond the theoretical stage. Exactly how, for example, a satellite image of a high value target or a signal intercept picked up by national technical means would be relayed to one tactical unit among hundreds for real-time engagement remains to be seen. To date, no joint command, control, communications, computers, intelligence, surveillance, and reconnaissance system that can interface securely and digitally across all services and commands is in sight. Exactly how specific systems might fit into an overarching transformation framework remains sketchy. To be useful to the warfighter, transformation must progress beyond broad rhetorical generalities to grapple with the specific realities of future war.

A second flaw in transformation thinking is a misconception about the nature of war. Transformation proponents insist that certainty can be approached in war. But war is grounded in the human condition—in the hopes, fears, pride, envy, prejudices, and passions of human beings organized



M-1 tanks being upgraded at Anniston Army Depot Combat Vehicle Facility

U.S. Army

Newly designed C-model A-10 makes first flight at Eglin Air Force Base, January 2005



U.S. Air Force

into political communities and military bodies. Far more than the clash of weapons or the neutralization of target sets, war is a contest of wills. As much today as yesterday, war is emotional, irrational, and erratic—the antithesis of the coldly logical and calculating view of many transformation proponents. War may begin for logical and rational reasons, and leaders will strive to keep it that way. But very quickly passions become inflamed, populations become resentful, regimes totter, and ambitions expand. War aims and policy objectives are changed, careers and administra-

if war can be reduced to the delivery of standoff, precision munitions, the political consequences of casualties decline correspondingly

tions rise and fall, allies rethink their positions, and enemies begin to act in unexpected ways.

Rejecting this reality, many transformation supporters instead ground their theories in the expectation of certainty, believing that war can be controlled, ordered, and regulated. Explicit in their discussion is the ability not only to see the enemy everywhere,

all the time, but to actually anticipate and predict “all opposing moves.” Full situational awareness will largely if not completely dissipate the fog and friction of war.

This is a dangerous and unwarranted assertion. The expectation of certainty in battle betrays a misplaced faith in technology that is hard to overstate; in fact, it is to misconceive war altogether. As Frederick Kagan pointed out, the essence of this vision is the simple reduction of warfare to a targeting drill.² In this schema, wars and campaigns appear as lists of targets to be located, attacked, and destroyed. This “technicist” view reflects the experiences and intellectual predispositions of many transformation advocates who come from air and naval backgrounds. Their

briefings reveal few conceptual distinctions between the levels of war. Further, they betray a misunderstanding of war’s intensely human character, a failure to recognize the different war-fighting domains of land, sea, air, and space, and a misreading of service core competencies and their contributions to joint warfare. Future war, like past war, will be characterized by complex-

ity, ambiguity, and uncertainty—an operating environment conspicuously absent from current transformation presentations.

Relatedly, at the core of much current thinking about transformation lies a desire for more politically acceptable forms of warfare. Indeed, in military operations since 9/11, air and naval forces have sustained negligible casualties relative to ground forces, which are higher by a factor of 100. If war can be reduced to the delivery of standoff, precision munitions against key targets, the political consequences of casualties decline correspondingly. Wars that can be fought quickly and decisively, without the need for major allies, mobilizing congressional and popular support, or calling up the Reserve, pose lower political risks domestically and internationally. But such an approach may not be realistic or desirable. Few would argue that rapid and decisive victory is a negative. But perhaps wars that can be fought without involving the Nation at large ought to give pause.

An Emphasis on Land

If one looks closely, a fundamental assumption is at work here: the U.S. military is now, or soon will be, inad-

equate to its national security tasks. Inexplicably, our military dominance in recent conflicts and our growing superiority relative to adversary states are conjugated as a “profound change in the strategic environment” sufficiently alarming to “compel a transformation of the U.S. military.”³ Official publications attempt to describe a nexus between nonstate actors such as al Qaeda and an urgent need to embrace network-centric warfare (NCW)—as though shadowy, low-tech terrorist organizations were somehow more, not less, vulnerable to precision strike. In fact, NCW was first articulated years before 9/11 and is clearly more suited to attacking fixed nodes and targetable centers of gravity than small cells of loosely organized terrorists who communicate by messenger and encrypted email.

There can be no question that the emerging threat posed by international terrorists possessing weapons of mass destruction (WMD) is profoundly dangerous. Destroying terrorists along with their infrastructure and assets is relatively straightforward, however, once they are located. Tracking their communications, funding, movement,

and access to unconventional weapons is far more important and has little to do with military transformation and much to do with improving human intelligence capabilities, interagency processes, and sharing information with allies. In this regard, the strategic nexus that has been drawn between the war on terrorism and transformation seems somewhat forced, since the resources allocated to “transformational” systems such as the F-22 may actually detract from solving the first order problem of defeating WMD-equipped terrorism, a far more serious threat to national security than the prospect of state-on-state conflict.

Advancing technology is yielding striking improvements in precision-guided weaponry and in the battlefield architecture for command, control, communications, and intelligence-sharing. The technology gap that has opened between our likely opponents and ourselves will only widen. These trends reinforce the arguments of transformation theorists, who have long contended that information and precision weapons alone can largely determine the outcome of wars

fought on land. The debate intensified following the collapse of the Soviet Union, which brought an end to the Air Force preoccupation with air-to-air combat and the Navy focus on blue-water sea control. The emphasis for all four services today is found on land. For the Air Force and Navy, in particular, this translates into standoff precision attacks against key land targets. The recent campaigns in Afghanistan and Iraq provide a preview of current transformational thinking applied to the battlefield. Indeed, it is likely that campaign planning itself was crafted at least in part to advance the transformation agenda. Our swift initial victories over primitive opponents convinced many that the age of transformation had arrived.

Nevertheless, overemphasis on airpower, precision engagement, and information superiority at the expense of an ability to seize and hold ground will pose grave risks for decisionmakers if allowed to crowd out, rather than complement, other critical capabilities. There is no question that airpower, encompassing missile strikes and unmanned aerial vehicles as well as manned aircraft, is the jewel in America’s national security crown. Its flexibility, speed, range, and crushing punch make it a first among equals.

The Problem of Data Transmission

For all its virtues, airpower has constraints. It lacks staying power. Limited by aircrew endurance, weather, weapons load, proximity of friendly bases, tanker support, availability of trained observers on the ground, and other factors, combat aircraft cannot stay on station indefinitely to dominate and secure terrain. The targeting process is only as good as the intelligence it is fed. While fixed targets can be attacked with good results, a thinking, adaptive enemy (particularly if blessed with an integrated air defense system) will frequently move high-value targets, conduct deception operations, and take refuge in



Artist's conception of littoral combat ship, designed to ensure maritime dominance and access for the joint force

Lockheed Martin Corporation



Contractor explaining features of heads-up display of F/A-22 simulator at Sheppard Air Force Base

U.S. Air Force (John Ingle)

civilian areas. Most importantly, airpower cannot physically seize and control terrain. While airpower is unquestionably the most effective form of military might in the U.S. arsenal, its limitations will persist for years to come. Airpower alone left the enemy in Iraq unimpressed in 2003, but it proved phenomenally effective combined with advancing ground forces.

Similarly, overreliance on information superiority carries risks of its

transmitting accurate information in real time to systems and units that can act on it immediately is the challenge

own. The advent of digitization and the proliferation of unmanned drones, increasingly capable satellite platforms, joint surveillance and target attack radar systems, and a host of other systems increasingly promises a high-resolution picture of the battlefield

that will enable joint commanders to locate, attack, and destroy an enemy while remaining hidden themselves. This concept of a view of the other side of the hill suggests to many that the friction and fog of the battlefield may soon be a thing of the past.

If technology alone were the answer, this might be true—although seeing everything militarily significant will probably never happen. But seeing the enemy is only half the battle.

Transmitting accurate information in real time to systems and units that can act on it immediately is the challenge. Because battlefield information and intelligence flows through and across multiple organizational boundaries and interfaces, it will inevitably be delayed, altered, or otherwise distorted. Staffs will take time to analyze and interpret new information and propose courses of action rather than immediately

pass it unfiltered to subordinate and adjacent formations.

In this regard, the fundamental factor not addressed by transformation advocates is how human beings process information. This is independent of the network's technical ability to transfer information. The decision to engage any target requires a human decision informed by analysis. Separating the important from the unimportant has always daunted commanders and staffs. Time rushes on as commanders and staffs wrestle with the thorny problems of battle command. What is the best system to engage an emerging target? How can we be sure who is really there? Is this important enough to postpone other engagements? What about collateral damage and innocent civilians? How much information should be pushed down to small units, and how much can they digest? Who else needs to know? Are there friendly elements in the area that are not on

the grid, such as intelligence elements, local supporters, or sources? Who must approve the strike?

These and other factors affect the technical problem of data transmission. They are not trivial concerns, nor are they particularly susceptible to technical solutions. In fact, the explosion of automation and computer systems in headquarters has brought an increase, not a decrease, in the size of headquarters staffs. So long as people make battlefield decisions, they will stop and think. So long as militaries are hierarchical, commanders will use their discretion. Whenever information crosses an organizational boundary, it will be altered, however subtly.

Perceptive adversaries will always strive to influence this cycle by altering commanders' perceptions—at times by using our technological edge against us to reinforce our operational and strategic prejudices and assumptions. Perhaps more than any other, this dimension of transformation remains neglected. We should work tirelessly to improve the link between sensor and shooter. It seems clear that order-of-magnitude increases in lethality and timeliness are at hand. Nevertheless, any vision of war that posits a "frictionless" battlefield,

a "seamless" flow of information, and "persistent and pervasive" intelligence is deeply flawed.

The Need for Strategic Balance

There is also the very real question of the fragility and vulnerability of the network. The investment needed to achieve the capabilities outlined in the transformation agenda will be massive, but effective asymmetric countermeasures are relatively cheap and readily available. The technology to build, field, and employ radiofrequency weapons, also known as high-power microwave weapons or "e-bombs," is rapidly proliferating. In fact, "any nation with a 1950s technology base capable of designing and building nuclear weapons and radars" can build a crude version now, and "simple and effective microwave weapons are ready to go."⁴ These weapons can profoundly affect information systems, particularly as most systems fielded since the Cold War (especially miniaturized, wireless, and off-the-shelf commercial systems) are not hardened against electromagnetic pulse and related effects.

The fact that many of our likely adversaries will not be technologically advanced states with easily targetable

centers of gravity also reinforces the need for strategic balance. These opponents may fight us on the low end to bleed us over time, communicating by messenger, wearing no uniforms, and existing in the midst of large populations unsympathetic to American war aims. Asymmetry cuts both ways, as the Russians have found in Chechnya, the Israelis in the occupied territories, and coalition forces in Iraq.

All this is not to say that the relationship between different forms of military power remains unchanged. We may well have evolved to the point where the traditional roles of ground and air forces are reversed in major conventional operations. Tomorrow's wars, like Afghanistan and Iraq, will likely see ground formations forcing the enemy into the open, where airpower and precision strike play the decisive role. But in urban settings, close terrain like Korea, or postconflict operations like Iraq, a strong ground capability will be central to success. Tomorrow's joint force cannot seize and hold ground from the air or depend on surrogate armies with their own agendas and doubtful capabilities. The interrelationship between all forms of military power—ground, sea, air, space, and information—is the wellspring of American strategic might.

That synergy is in fact precisely the point. For decades, the Pentagon's greatest strategic asset has been strength in all dimensions. Able to project all forms of military power over great distances and sustain them virtually indefinitely, the United States combines powerful land forces, overwhelming air forces, superior naval forces, and unrivalled nuclear, space, and information capabilities, making it the most dominant power on the planet by a wide margin. But recent military successes must not obscure the fundamental basis of that strength. In postconflict or stability operations and major combat operations alike, a strong and sustainable ground force will be indispensable to achieving political objectives. That capability must not be allowed to wither in the rush to transform.



Virtual Battlefield System One, fully interactive, 3-D training application provides synthetic environment small unit tactics

U.S. Marine Corps

Viewing Transformation Cautiously

The history of armed conflict in the 20th century supports the thesis that advanced technology alone is not enough. In 1940, the Germans were equipped with fewer tanks, guns, and troops than their opponents, and the equipment they did have was inferior. Yet they overran the Norwegians, Danes, French, Belgians, Dutch, and British in a few weeks. Eighteen months later, they owned all of Europe, from the Arctic Circle to Crete, and from the Atlantic to the gates of Moscow. The sources of German power lay not in numbers, equipment, or technology, but in leadership, training, organization, and doctrine.

The Korean and Vietnam conflicts are also instructive. Although dramatically outmatched in air and naval power, and lacking most of the high-tech weaponry of the United States, North Korea and North Vietnam fought American forces to a standstill in prolonged wars that saw Washington commit hundreds of thousands of soldiers. Technology was unable to convincingly defeat a resolute opponent fighting on favorable terrain, enabled by “off-limits” sanctuaries across the border, and motivated by ideological goals.

The examples of the Korean War in 1950, the Gulf War in 1991, and the 9/11 attacks also demonstrate that confidence in our ability to assess future threats and conflicts must be heavily qualified. We cannot know for certain where, when, and under what conditions the U.S. military may be called on to fight. In fact, the very certainty with which transformation advocates assert their theories gives pause. Foreknowledge of adversary intentions and political dynamics is an art as much as a science, one not always amenable to signal intercepts and satellite photos.

A conflict on the Korean Peninsula, for example, could obviate lessons learned from Afghanistan and Iraq. The prize of Seoul lies just across the border, well inside North Korean artillery range. Pyongyang would almost

certainly move to interdict U.S. air and sea ports of debarkation, employing chemical or biological weapons far behind the initial line of contact. American airpower and precision engagement would be severely degraded by weather, mountainous terrain, and fortifications shielding much of the North’s artillery and command and control. With massive forces facing each other at close range, the effectiveness of stand-off weapons would be lessened as well. Hard fighting in complex terrain will be needed to prevail in Korea.

Most military officers share the above concerns intuitively and experientially. Recent war college studies reveal that members of all four services view transformation more cautiously than their civilian counterparts. While supportive of information-based warfare as a way to achieve more decisive results with lower casualties, a strong majority are unwilling to reduce force structure or readiness in favor of new approaches to warfare. Most serving officers express confidence in the military’s ability to cope with current and projected threats without radically altering the force, especially in a time of unprecedented turbulence. Among

Army and Marine officers particularly, warfare is viewed as a human endeavor, not a technical exercise. Thus the character of war retains its human face.

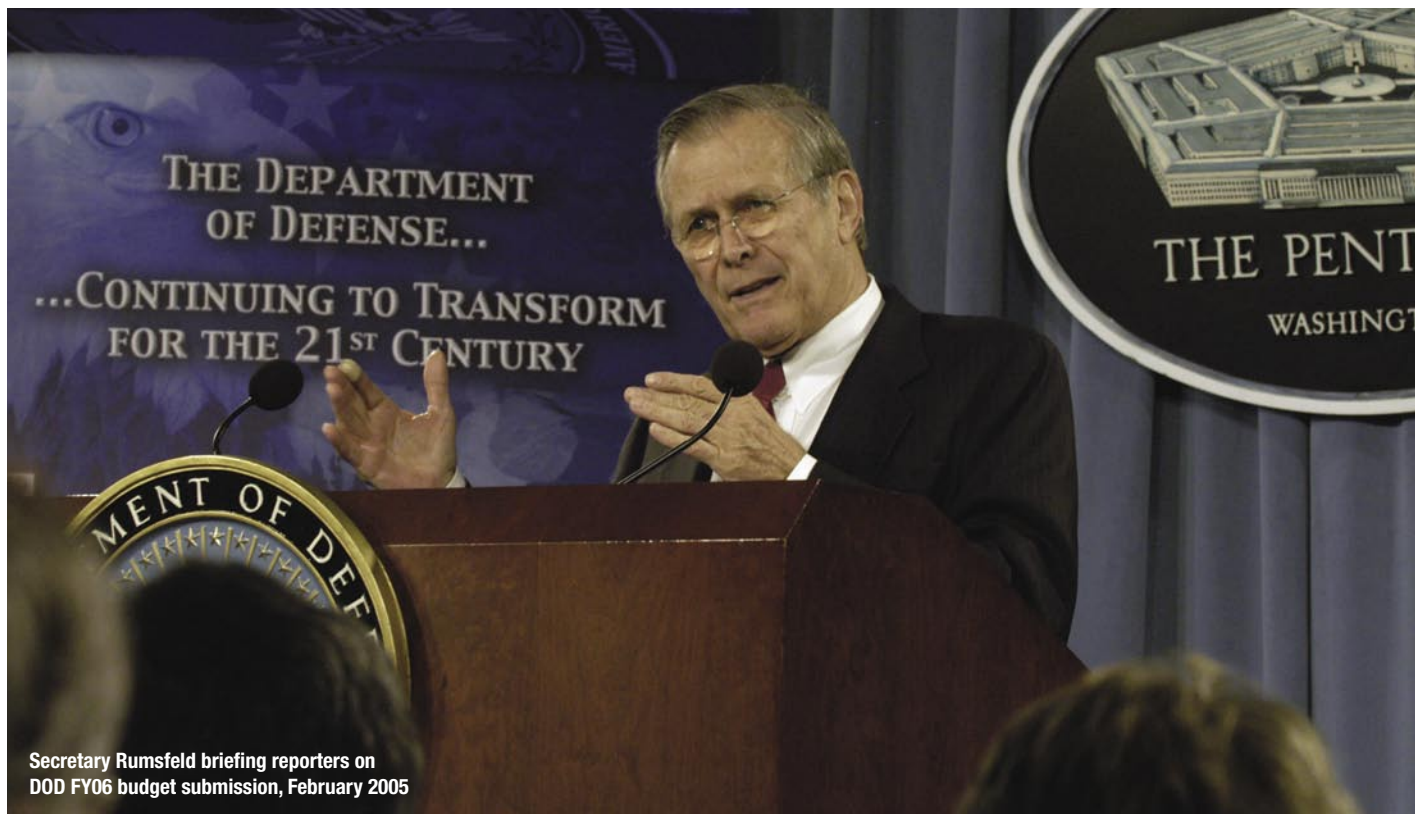
These considerations suggest the need for more serious analysis of transformation’s key concepts and assertions, as well as more specificity about desired capabilities, programs, and tradeoffs. Although the momentum behind transformation is enormous, the future of our national security demands that we think clearly and holistically and adopt a strategically balanced and perhaps more evolutionary approach. Revolutionary or radical change is exciting, but we cannot afford to get it wrong. In the business world, which has so profoundly influenced transformation thinking, the price of failure is a drop in earnings or corporate collapse. Failure in war brings infinitely more enduring penalties.

An aggressive but evolutionary approach to transformation, which pushes the envelope without breaking it, offers a balance between enhanced capabilities and acceptable strategic risk. That evolution need not be lengthy, but it must not risk everything on strategic doctrines that discount the fundamental principle of strategic balance.



Joint Direct Attack Munitions to be loaded on Marine F/A-18 supporting combat operations in Fallujah

U.S. Marine Corps (Paul Leicht)



Secretary Rumsfeld briefing reporters on DOD FY06 budget submission, February 2005

A monist strategy, relying on information technology and precision strike while neglecting the means needed to actually seize and control the land, offers politically attractive but illusory benefits. If history teaches anything, it is that war is as unpredictable in its forms and processes as it is enduring in the realm of human affairs. Today, the United States enjoys an order of magnitude advantage over potential adversaries in the military sphere. By relying on a balanced and synergistic application of all forms of military power, we can be confident that our dominance will continue to serve our national interests.

By all means, the exciting potential of the information revolution should be harnessed to make America safer. The ability to share information more quickly and deliver weapons effects more precisely ought to be pursued vigorously. But we must not abandon the true sources of our military power as we transform. We must not become a military that can do only one thing: standoff precision strike.

While the conduct of war continues to change, its nature and character will not. The field of human conflict remains ineluctably human, not technical; inherently complex, not orderly; and inescapably defined by the land and the populations and resources found there.

All agree that transformation holds great promise for a more effective military and a safer America. All thoughtful professionals should applaud the push to enhance our ability to share information rapidly and attack enemies in a timely and precise manner. But we must not become so dependent on high-resolution information that we lose our capacity to fight without it. The debate about transformation must not be allowed to become an ideological litmus test. Despite efforts to tie everything the military is or does to it, transformation is not an end in itself. Enhancing the security of the Nation and its people must ever be the objective. Rigorous, searching analysis, which combines both hard-won combat experience in

the field and a strong intellectual foundation, is needed now.

In future years and future wars, America's sons and daughters in uniform will reap the rewards, or bear the cost, of transforming our military. They will man the legions that will largely determine the course of national security. We owe it to them and to the American people to get it right. **JFQ**

NOTES

¹ Department of Defense Office of Force Transformation, *Military Transformation: A Strategic Approach* (Washington: Director, Force Transformation, Office of the Secretary of Defense, 2003), 8.

² Frederick W. Kagan, "War and Aftermath," *Policy Review*, (August 2003), 22.

³ *Military Transformation*, 29.

⁴ See Michael Abrams, "The Dawn of the E-Bomb," *Spectrum* (November 2003), 11, 24–30.

Do you have another point of view? Consider *JFQ* as an outlet. See www.ndu.edu/inss/press/nduphp.html for information on submitting articles and letters to the editor.