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Military Force Transformation: Progress, Costs, Benefits and Tasks Remaining

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Foreword

Following the recent wars in Afghanistan and Iraq, a consensus has emerged that the transformation of the U.S. military has been a success. But, as current events in Iraq and elsewhere demonstrate, U.S. force transformation is not yet complete. Moreover, as the word “success” encompasses both absolute and relative components, both will need to be well understood in order for transformation to be completed, and to be assured the long-term support of law-makers and the public.

In an absolute sense, one might ask: has transformation yielded relevant and important new capabilities? Has it saved innocent lives? Even if the answer to both of these questions is yes (which the author of this report believes it to be), the more difficult relative component remains. Has transformation so improved U.S. military capabilities since the end of the Cold War that it has proven its worth? Has transformation produced enough value to justify the costs incurred by the U.S. government? How much has transformation actually cost?

The Atlantic Council asked S. J. (Sy) Deitchman, a member of our Transformation working group, to draw on his prior work on this subject and then expand upon the results. We asked that he elaborate not only the history, costs and benefits of transformation to date, but also that he examine what remains to be done, to prevent military success against regular forces from slipping into a long and costly irregular war. The Council is most grateful for Sy’s sharp insights, original analysis and precise, thoughtful writing, though it takes no institutional position on the issues discussed here.

I also wish to note, on Sy’s behalf, that the quantitative economic and force performance comparisons in this paper were developed during a study by the author and Messrs. Ray Hemann and Lee Hunt, working for Advanced Systems Research, Inc. of Pasadena, CA, under contract to the Director, Net Assessment, Office of the Secretary of Defense. They have been updated here with more recent U.S. Defense budget data. The broader discussion of the transformation of the armed forces and its strategic significance is the responsibility of the author alone.

The Council is grateful to John Sandrock and Dick Nelson, respectively the current and former Directors of the Program on International Security, for their astute management of this project. In addition, the author wishes to thank Jason Purcell, also of the Council, for his efforts in reviewing and editing the paper to bring it into form for publication, and for the many cogent points of discussion he added along the way.

Lastly, the Atlantic Council thanks NATO’s Allied Command Transformation and Allied Command Operations, without whose generous support this paper – and indeed the Council’s broader efforts on military transformation – would not have been possible.

Henry E. Catto, Jr.

Chairman of the Board, Atlantic Council of the United States

Key Judgments

In general, the transformation of the United States' armed forces has shown some remarkable successes. Over the decade and a half since the end of the Cold War, the armed forces have indeed transformed themselves to adapt to new strategic conditions and needs, and to be able to achieve great economy of force while remaining a powerful fighting machine able to prevail against heavy odds. Compared with prior experience in modern warfare, U.S. forces are now better able to minimize civilian damage and casualties even as – or partly because – they attack opposing forces with ever greater precision and speed.

Force transformation has been accelerated by a drive to limit civilian damage and casualties¹ and was fostered by two major advances in technology. The first was a satellite navigation-based guidance system that greatly reduced the cost of precision-guided weapons, which the military Services had previously been reluctant to use in abundance because of their high unit costs. The second incorporates the same major advances in information technology that have had such a profound impact on the civilian world. These advances enabled U.S. forces to be embedded in a more accurate and complete information and targeting network than had been possible earlier. This, in turn, permitted changing command relationships to allow for more responsibility and authority at lower levels of command, thereby making today's forces more agile and responsive to battlefield conditions than Cold War-era forces had been. All together, these and other changes have led to a true melding of air and land forces able to defeat opposing forces on the ground in short order.

The Cost of Transformation

In the same way that productivity has been increased in the civilian economy, the force changes necessary for transformation were accomplished by large exchanges of labor for capital (that is, through higher per-soldier capital expenditures on fewer total soldiers). These exchanges can be illustrated by comparing the armed forces' size and budgets for 1970 and 2003. U.S. forces in 1970 had almost no precision engagement capability as we now know it, while today's forces are essentially built around that capability. The defense budgets of the two years, in constant 2004 dollars, are nearly equal, but today's forces are far smaller than the forces were in 1970, at the height of the war in Vietnam. For example, the Army today is one-third the size of the 1970 Army, and the other Services are comparably smaller than they were then. Thus, the expenditure per person in the armed forces approximately doubled over that time period. The equipment cost per person has increased by about a factor of two, while the allocated personnel cost per person has increased by about two-thirds.

These increases reflect both the fact of more elaborately and effectively equipped forces and the need for more highly educated and trained volunteer personnel to use the military equipment. Overall, the United States now spends over \$260,000 per person per year in its

¹ Especially in the conflicts in which the United States has been involved since the end of the Cold War, in the Balkans, the Persian Gulf region and Afghanistan.

armed forces, which is significantly more than is spent by its closest allies and very much more than is spent by any potential antagonist.

Returns on the Transformation Investment

What has been the return on this huge investment? The returns appear to have been far larger than the investment when they can be measured in dollar terms: at the macro level, smaller forces and a reduced length of organized conflict from the first to the second Gulf War yielded enough cost savings to pay for two or more years of such investment, while at the micro level the cost to destroy any military target has been reduced to as little as one-fifteenth or less of the cost under previous conditions.

Indicators of the less tangible but nevertheless critically important benefits of transformation can be derived from comparisons of performance in conflicts that were similar, though of course no two conflicts are exactly identical. Such comparisons might include the length of the Soviet and U.S. campaigns in Afghanistan and the numbers of military casualties in those campaigns; and the number of civilian casualties incurred during the bombing of Dresden in World War II when compared with the more recent bombings of Belgrade and Baghdad – all against similar target arrays. These and other possible comparisons attest to the vast reduction in the indirect costs of warfare that has resulted from the employment of precision engagement capability on the part of the U.S. armed forces.

Progress Still to be Made

The Vulnerabilities of Transformed Forces

Despite the impressive returns that have accrued to the United States as a result of its investment, the process of force transformation is not yet complete, as evidenced by errant attacks against civilian targets, fratricidal attacks on friendly force elements, long delays or inability to find and dispose of opposition leadership and the many vulnerabilities inherent in the new force posture. These vulnerabilities include the possibility that opponents will be able to:

- disrupt the information and communication network that is critical to the current modes of operation of U.S. forces;
- field effective anti-aircraft defenses, that could seriously interfere with – or deny – the air supremacy on which U.S. forces also depend; or
- disrupt the flow of logistic support over land, sea and air, without which the rapid maneuver and precision combat capability of transformed forces would be impossible.

Most seriously of all, since the transformed forces are designed to achieve quick victories over opposing organized armed forces, opponents could deny the fruits of such victories by converting swiftly successful campaigns into long, draining, irregular conflicts with all the concomitant diplomatic, economic and political repercussions. This is clearly happening in Iraq today.

Going Forward

Future force development must therefore take two directions. First, current precision engagement trends, with further substitution of capital for labor as planned, should indeed continue so as to keep the United States' armed forces well ahead of any potential adversaries, and in the process guard against strategic surprise. This means continuing improvement of the information network and the ongoing acquisition of major systems, such as the Navy's DD(X) destroyer, the Air Force's F/A-22 fighter, the Marines' V-22 vertical lift aircraft, the F-35 Joint Strike Fighter and others. Pursuing such systems – even in the face of controversy over their cost and usefulness – would be especially prudent given that potential adversaries are acquiring countering systems, available on the market now, that are able to exploit the technical vulnerabilities of U.S. forces, and that can, in some cases, out-perform the United States' currently most advanced systems. Regardless of current need or need in the immediate future, these systems should remain in acquisition now because it would take decades to reconstitute a development and manufacturing capability for them if the United States were to allow its current efforts to atrophy, while adverse strategic changes can appear in only a year or two.

The second direction in which U.S. and other transformed forces must develop is toward an improved ability to prevent the conversion of military success against organized forces in the field into a long and divisive irregular war in the conflict area. In future operations, the United States will require the ability to establish, within cultures different from its own, provisional civil governments rapidly; to rebuild destroyed and disrupted infrastructure; to protect the local population and infrastructure against guerrilla and terrorist depredations; to gain intelligence leading to the location and neutralizing of assailants; and to work effectively with allies who may also be of different cultures. Using military forces for these purposes, although currently controversial, would gain critical time in a crisis or other difficult scenario because they are already in place, *a priori* trained, disciplined, able to marshal resources rapidly and to engage in combat if need be. To maximize the chances of success in staving off a long, drawn-out irregular war after a rapid victory over organized forces, the military's efforts must be complemented by national and international diplomatic and economic initiatives aimed at changing the conditions that induce lingering opposition in the theater of war, difficult as that may sometimes be.

This bi-directional continuation of the United States' post-Cold War military force transformation will require extensive resources. For although the nature (and perhaps the cost) of warfare has been altered by the transformation of the U.S. armed forces, strategic competition, with its myriad complexities, will persist. A sustained and significant outlay of resources will continue to be necessary to mitigate, to the extent possible, the degree of risk to the country's national security and international interests.

Military Force Transformation:

Progress, Costs, Benefits and Tasks Remaining

I. Transformation: A Long and Continual Process

The U.S. armed forces today are characterized in large measure by their unique ability to attack opposing military forces with enough precision and speed to prevail against heavy odds while yet achieving great economy of force. This capability is, as much as any of the other features of today's military, indicative of its transformation from a force tailored to the demands of the Cold War to one far better suited to the new forms of armed conflict facing the United States and its allies.

The Difficulties and Dynamics of Change

Changing the basis of the orientation of armed forces from one set of strategic conditions (and mission spectrum) to another is a long and difficult task, fraught with internal conflict. History shows that some countries never successfully accomplish it. This is because it is a process driven by operational necessity and powered by technological opportunity, but opposed by the tried and true. Military leaders are understandably reluctant to exchange the known and tested for the new and untested without urgent and compelling evidence of the need to do so – and of the probable benefits – especially when the stakes are high. The U.S. armed forces have, over the past decade and a half, gone through just such a period of soul-searching change – successfully but not yet completely.

Of course, change in the armed forces is at some level continual; equipment is constantly upgraded and replaced, potential opposition advances in directions dictated by its perceptions both of its own needs and of what others are doing (and intending) and the military reaches for the best available technology at any given time in order to meet actual conditions and challenges. Thus, during the Cold War the armed forces of the United States and its allies – as well as those of the Soviets – were continually making intra-generational improvements while also acquiring new generations of equipment and systems with new capabilities. This endless cycle of competitive evolution gradually changed and greatly upgraded the capabilities of the United States' armed forces, though these still reflected

much the same kinds of formations, doctrines and general modes of operation that emerged from World War II, albeit with increasingly dispersed operations.²

Increased Impetus at the End of the Cold War

The end of the Cold War presented new and different challenges that both accelerated the pace of change and initiated the process of absorbing and responding to the organizational and operational implications of the changes that had already been under way. The threats that the United States had to meet became considerably more diffuse, involving unanticipated conflicts that threatened its interests in places it had not planned to fight (such as Iraq, the Balkans and Afghanistan) and against military opposition that it had not planned to meet (and for which U.S. forces could be considered both over-designed and mal-designed in many respects).

While the inherent combat capabilities of U.S. forces still overmatched those of their opposition, they were ponderous when agility was needed, and they lacked – or had only marginally – many of the capabilities that were demanded by the new situations in which they found themselves.

II. Force Evolution in the 1990s

A Gathering Case for Change

Throughout the 1990s, conflicts such as the Gulf War and the North Atlantic Treaty Organization (NATO) intervention in the Balkans provided evidence of the need for, and utility of, change in the structure and approach of the U.S. military. But such change did not occur in a vacuum. There had been two kinds of advances in the armed forces during the decades before “the Wall came down.” The first was in improved platforms – ships, aircraft, tanks – and the munitions they employed. The second was in the areas of sensing, information processing and communications (including electronic warfare), both surface- and space-based. Taken all together, the latter changes improved knowledge of:

- where units of the armed forces and command structures on both sides of a conflict are located;
- what they are doing; and
- how the opposition in all its dimensions can best be attacked and defeated.

The swift defeat of Iraq in the 1991 Gulf War (facilitated by the employment of forces and military operational doctrines originally developed to combat the Soviets in Europe) gave the first indication of the effectiveness of the new capabilities that had been developed on the Western side of the Cold War. More specifically, this led to a heightened appreciation of the value of both precision air-to-surface weaponry and the combat information network, for which the development of equipment and relevant theory then accelerated markedly. The following period of ferment saw the emergence of increased emphasis on the information

² At least, this was true of the country’s conventional – or non-nuclear – forces.

aspects of warfare and a growing acceptance of the utility of the key technologies that later came to underlie the transformation of the military forces.

Lingering resistance to the extensive use of precision air-to-surface munitions was overcome by the exigencies of warfare in the Balkans in the mid-to-late 1990s. The persistent reluctance on the part of the Services to rely heavily on such munitions had been based largely on the perceived high cost of guided munitions relative to the cost of “dumb” or unguided bombs, despite repeated analytic demonstrations that the overall cost of attacking and destroying a target would be smaller if the more expensive guided munitions were used. Such misperceptions were finally overcome by the need to engage targets with extreme precision in order to minimize casualties among civilians in the targets’ vicinity – first in Bosnia and later with the bombing of Serbia as part of the NATO campaign to stem the violence in Kosovo.

At the same time, technology provided an answer to the Services’ cost concerns in the form of a guidance kit, which combined the satellite-based Global Positioning System (GPS) with an inertial guidance mechanism internal to the kit. This kit could be attached to a free-fall bomb, thereby converting it into the Joint Direct Attack Munition (JDAM) – an all-weather, precision air-to-surface munition that cost about half as much as the next least expensive guided weapon, the fair-weather laser-guided bomb. Simultaneously, and partly through the use of worldwide civilian communications, the command, control and targeting network within which the more accurate weaponry would be used was also greatly upgraded and made more responsive.

Accepting, Refining and Promoting Transformational Concepts

As strategic developments were showing how the U.S. armed forces would have to change to meet post-Cold War conditions and challenges, the Joint Chiefs of Staff, in 1996, published their *Joint Vision 2010*, and later, *Joint Vision 2020*. Although some *cognoscenti* have derided the documents as being too general and too vague in regard to how the U.S. armed forces would be organized and would fight, the Joint Vision documents did ratify the Services’ acceptance of the idea of “precision engagement,” which the Joint Chiefs defined in *Joint Vision 2010* as, “...a system of systems that enables our forces to locate the objective or target, provide responsive command and control, generate the desired effect, assess our level of success, and retain the flexibility to reengage with precision when required.” Although this definition was later refined, its inclusion, together with “dominant maneuver” (“...the application of information, engagement, and mobility capabilities to position and employ widely dispersed joint...forces...”), “full dimensional protection” and “focused logistics” provided an indication of the direction in which the U.S. military was moving to transform itself to meet the new strategic conditions.

The concept of Network-Centric Warfare was then introduced and elaborated by Vice Admiral Arthur Cebrowski (USN, now retired), and was subsequently adopted by the other Services and the Joint Chiefs. He called for building the armed forces and their operations around the intelligence, combat information, targeting and command and control network within which the forces in the field are embedded. In “militarese”, the network is commonly

referred to as C4ISR, or Command, Control, Communications, Computers, Intelligence, Surveillance and Reconnaissance, but “Network-Centric Warfare” is larger than that. Cebrowski was making an argument to change the organizing principle of the armed forces. He proposed thinking about networked armed forces in terms of military objectives, with combat formations tied together and managed via the C4ISR network, and all forces and weapons integrated into that network. The gauge of success would be the timeliness and effectiveness of operations as a whole – inside the opponent’s response timelines. This represented a radical departure from thinking about the armed forces in terms of platforms – the tanks, ships and aircraft that had formed their organizing basis in previous times.

In addition to all this, several outside advisory panels had concluded that the armed forces would have to be further changed to meet new kinds of threats, from transnational terrorists to more organized, “traditional” aggressors operating in parts of the world that had received little attention during the Cold War. Thus, when Secretary of Defense Donald Rumsfeld, upon taking office in 2001, put forward the idea of transforming the armed forces to reflect the emergence of such new threats, there was already a firm conceptual base on which the U.S. military could build. Moreover, the expressed emphasis on “transformation” on the part of the head of the Defense Department provided an impetus for the members of the armed forces to adopt the idea of change as an institutional organizing principle for future forces. That is, “change” took the place of the bureaucratic inertia that would have struggled to preserve existing patterns of organization and operation. The result, as evidenced by the frequent use of the term “transformational” in reference to systems and budgets, was an even greater *pace* of change, with outcomes evident in both Afghanistan and the second Gulf War.

The New Capabilities and Operational Approach of Transforming Forces

The operational impact of the transformation of the U.S. armed forces was manifest in increased responsiveness to changing battlefield conditions and in their precision engagement capability in the late 1990s and early 2000s. Both of these improvements grew out of focus on the combat “network”.

Although initiated by military R&D programs in the 1960s and 1970s, much of the computing and communications capability underlying the modern combat network has been furnished by the civilian economy. The decentralized management techniques developed in that economy have also been adopted by the armed forces. This is illustrated by a shift in the permission cycle for attacking targets. Previously, an aircraft or other “shooter” needed the approval of an often cumbersome hierarchy of command echelons to attack targets. Currently, the “target to shooter” dynamic of the transformed forces permits engagement of a target as soon as it is found and identified by the information network, within set rules of engagement. In management terms, this dynamic could be described as “management” (political and military leaders) setting policy before getting out of the “implementation loop” (operational phase) and into a monitoring mode. Such a system reduces target engagement times from many hours or even days to as little as a few minutes.

The increased responsiveness of U.S. forces, together with the transportation systems that enable rapid movement and the guided weapons that enable more accurate attacks on targets, by broadly eliminating the need for repeat attacks that slow operational progress and lead to increased military and civilian casualties and collateral damage, have contributed greatly to the military's "dominant maneuver" and precision engagement capability.³ U.S. forces are now able to overcome an opponent before he can react to their opening maneuvers in many cases.

The combined use of precision weapons and the combat network in Afghanistan – and, most recently, in Iraq during the second Gulf War – yielded the first true integration of air and ground forces into a single fighting unit that could engage opposing ground forces decisively in record short times. Thus the lessons learned from the 1991 Gulf War and the mid-1990s conflicts in the Balkans had transformed the forces within a decade and a half of the end of the Cold War – revolutionizing the way in which the militaries of the United States and its allies are able to approach many of today's most serious threats, including persistent international terrorism and the development of weapons of mass destruction (WMD) by difficult and dangerous states.

However, despite the impressive performance of U.S. forces in recent conflicts, the transformation of those forces is not yet complete. The need for more progress is attested to by attacks against mistaken civilian targets, by fratricidal attacks against friendly force elements, by long delays or inability to find and dispose of opposition leadership and by the many vulnerabilities inherent in the U.S. military's new force posture. These issues will be discussed in detail later in this paper.

III. The Costs and Benefits of Force Transformation

How Much Has Force Transformation Actually Cost?

In the same way that productivity has been increased in the civilian economy, the force changes necessary for transformation were accomplished by large exchanges of labor for capital (that is, through higher per-person capital expenditures on fewer total soldiers, sailors and airmen). These exchanges can be illustrated by comparing the armed forces' size and budgets for 1970 and 2003. The value of the comparison across this time span is that U.S. forces in 1970 had almost none of today's precision engagement capability (aside from a few guided air-to-surface weapons, used within the cumbersome, hierarchical command structure of the Cold War), while such capability is now broadly embedded in most of the Services' equipment and systems as well as their tactical and operational techniques. Thus, changes in expenditure per person in the armed forces can be viewed as a strong indicator of the cost of the precision engagement capability that is a key quality of the transformed forces.⁴

³ The systems that enable precision engagement are basic to the current use of the term "revolution in military affairs" (RMA) and all its implications for the armed forces.

⁴ Trying to assess that cost directly would require a review of hundreds of individual Defense budget line items as well as corresponding judgments about the relationship of each to precision engagement capability – a daunting task that would likely yield little additional payoff.

Expressed in 2004 dollars, the published U.S. military budget was \$382.7 billion in 1970 (at the height of the war in Vietnam) and \$372.4 billion in 2003. Thus, the two budgets were essentially the same, coming to within a few percent of each other. Yet the disparity of force sizes, and therefore expenditures per person in the armed forces, is striking. For example, the Army today is one-third the size of the 1970 Army, and the other Services are comparably smaller than they were then. This translates to an approximate doubling of the expenditure per person in the U.S. armed forces over the 1970 to 2003 time period. Examination of the component pieces of this cost structure shows that the equipment expenditure per person was increased by about a factor of two, while the allocated personnel expenditure per person was increased by about two-thirds. The overall change is illustrated in the table below.⁵

**Table 1: Cost per Person Ratios in the United States Armed Forces:
1970 & 2003**

| | Total Budget, 1970 (\$ billions) | Total Budget, 2003 (\$ billions) | Total People, 1970 (millions) | Total People, 2003 (millions) | Cost/ Person, 1970 (\$ thousands) | Cost/ Person, 2003 (\$ thousands) | Cost/ Person Ratio 2003/1970 |
|-----------------------|---|---|--|--|--|--|---------------------------------------|
| Army | 124.2 | 92.7 | 1.32 | 0.48 | 93.9 | 193.1 | 2.06 |
| Navy/ Marine Corps | 113.1 | 113.4 | 0.95 | 0.56 | 118.8 | 202.1 | 1.70 |
| Air Force | 118.9 | 110.2 | 0.79 | 0.37 | 150.3 | 299.5 | 1.99 |
| Total: U.S. DOD | 382.7 | 372.4 | 3.06 | 1.41 | 124.9 | 264.3 | 2.12 ⁶ |

(All budget figures expressed in constant FY 2004 dollars)

As noted above, and summarized in the last column of Table 1, expenditure per person in the U.S. armed forces increased by about a factor of two between 1970 and 2003. Along with the rise in equipment cost, the overall increase reflects a rise in personnel costs. Making up approximately half of the defense budget, such costs have increased substantially as the volunteer armed forces have had to compete with the civilian economy for labor. But more to the point, the increased personnel cost per person must in some way also reflect the increased quality and training costs of the personnel needed to use the advanced equipment and systems that make precision engagement what it is. The all-volunteer forces of 2003 had a higher average education level than did the drafted forces of 1970.

⁵ The budget numbers shown are Congressionally authorized Budget Authority, as distinct from other ways of expressing the Defense budget, such as Total Obligational Authority or outlays. The Service personnel numbers refer to active-duty military Service personnel only. Reserves may vary in size, training and the modernity of their equipment. Together with the civilian Service and Defense Department personnel and supporting contractors, the Reserves may be considered part of the cost of supporting and being prepared to augment the active-duty forces. The budget numbers used above do include the costs of these Defense Department and Service force elements, allocated to active duty Service personnel.

⁶ The increase in the DOD budget as a whole is larger than the increases for the individual services because there is relatively more spent on Department-wide programs now than was spent in 1970.

U.S. Spending Compared with that of its Allies

In debates about military spending and priorities, a recurring comment is that the U.S. defense budget is larger than the budgets of many allies or opponents taken together. It will always be possible to find such a combination of allies or opponents with which to compare. Part of the disparity comes from the sheer size of the U.S. armed forces; they are larger than those of most of the countries with which such comparisons are made. But even accounting for that fact, it turns out that U.S. expenditures on the armed forces are also far larger on a per-person basis.

For example, there has been much attention paid to the intent of some of the European members of NATO (the North Atlantic Treaty Organization) to build a European rapid-response military force. Likewise, there have been increasing efforts on the part of some of the United States' closest allies to develop new weapon systems – such as tactical aircraft – that would rival their U.S. equivalents. Yet these would seem to be daunting tasks in view of the disparity between U.S. and allied military expenditures. Whereas the United States spends over \$260,000 per person in its armed forces, Britain, France and Germany, for example, spend about half or less of that amount.⁷ This difference in expenditures per person partly indicates a disparity in personnel costs. More saliently, however, it reflects the fact that allied forces have not yet made the advances that would enable them to undertake precision engagement as the U.S. armed forces currently perform it. It is not surprising that significant differences in engagement capability between the United States and its allies were noted during the Balkan campaigns.

U.S. Spending Compared with that of its Adversaries

Potentially Hostile Countries and Hostile Terrorist Groups

The disparity in expenditures on military matters is more marked when U.S. forces are compared with those of possible opponents. Among the countries that could some day become overt military antagonists – for example, North Korea, China (over Taiwan), Iran (over clashes with Islamist extremists in the Middle East), Pakistan (if an Islamist extremist coup should topple the present friendly government) or even Iraq (before the current war) – the mid-1990s per person military expenditures were still on the order of a few percent of those of the United States. Among these, the country that spent the highest percentage of the U.S. figure was China, at 16 percent (all the others were under 5 percent).

⁷ This statement must be tempered by the uncertainty introduced into the comparison by the recently increased use of U.S. Defense Department civilian personnel and contractors to perform logistics- and combat service support-oriented tasks that may be performed by active-duty military personnel in allied forces. Whereas the ratio of civilian personnel to active-duty military personnel in the U.S. Services and Defense Department did not change appreciably between 1970 and 2003, the relative numbers of people in industry who are performing defense-related work for the military forces increased markedly over that period. From the readily available data, it is impossible to separate the defense-related industry personnel into those developing and producing weapon systems and performing related analytical and planning work and those performing direct services such as field logistics and combat service support for the armed forces. Correcting the data for the latter kinds of work, if much more of it is performed by active-duty military personnel in allied forces, would indeed reduce the disparity between the U.S. per-person costs and those of its allies, though it is unlikely that the costs per person would end up equalized as a result.

Although it is impossible to know exactly how much money is behind a transnational terrorist organization like *al Qaeda*, the personal fortune of Osama Bin Laden, which he is believed to have devoted to *al Qaeda* activities, is quoted variously as being in the hundreds of millions of dollars. Yet the devastating September 11, 2001 attack on the United States was estimated to have cost around \$500,000 – a tiny sum when compared with the cost of the military campaigns that the United States undertakes.

Significance of Opponents' Asymmetric Expenditures

As a general matter, the opposition to U.S. military dominance is seen to be far less costly than transforming and maintaining the capabilities of the U.S. military. Specifically, while the United States has built its military capability around extensive use of aviation, the opposition – when it does not use simple terrorist or guerrilla techniques – relies on what are essentially World War II types of forces (with more advanced equipment in some areas) and overlays of modern, or not so modern, missilery. In this way, opposition forces can launch effective counter-attacks with far less expensive weapons than those employed by the United States: for example, an essentially zero-cost Soviet-era rocket-propelled grenade can down a sophisticated multimillion-dollar attack helicopter.

This indicates that although the enormous U.S. investment in force transformation can buy it significant new capabilities, these do not necessarily confer invincibility from opposition attack or counter-attack. Moreover, persistent assault by an opposition group using outdated weaponry and asymmetric tactics – while very unlikely to produce a traditional military victory – might, as in Somalia, appear successful by leading to a strategic calculation on the part of the United States and its allies that the direct and indirect cost of a particular conflict is not worth the potential gain.

Return on the Investment in Force Transformation

Especially in view of the threat of asymmetric warfare, it appears that the United States is paying a very high price for the capabilities on which it is counting to sustain the military dominance of its forces. Continual carping in some quarters at the size of the Defense budget raises the question: is the high price worth it? Answering this question requires determining what the return has been on the United States' transformation investment.

Return on investment in matters of military performance is difficult to measure directly. It is certainly true that victory in battle is the ultimate payoff. But how can one be sure that a given victory could not have been achieved less expensively? One cannot; history does not reveal its alternatives. But one can seek either direct or indirect indicators of return on investment, and then judge – subjectively – whether a given investment appears to have had a sufficiently high return to justify having made it, or to justify continuing it into the future.

Several indicators of return on investment are possible in the military context.

- At the “macro” level, if the investment is believed to have shortened a war in which that investment was a key factor, then the direct and indirect cost of days (or months and years) of war will have been saved. Such savings can then be compared with the original

investment. Additionally, shorter wars have intrinsic value – for example, in reduced military casualties on one or both sides, or in reduced opportunity for the emergence of draining political furor over prolonged warfare.

- At the “micro” level, the cost of destroying military targets in the old and new modes can be compared, to determine whether and where savings have been achieved. Similarly, a war that can be won with fewer forces because of a given investment indicates a return on that investment in the form of the enhanced power of the smaller forces.
- War will inevitably cause damage to local civilian infrastructure and cause casualties among civilians near the battle. Since we value human life, a reduction in civilian casualties is a good indicator of the payoff from the shorter and more precise ways of engaging and destroying enemy military forces that have been developed in the transformation of our military forces.
- More generally, if the investment is worthwhile, it should make resources available for other expenditures, at least within the military environment.

Ideally, one would like to compare the old and the new ways of engaging enemy forces under the same circumstances or in identical contexts in order to obtain indicators of return on investment such as those described. However, as noted above, history does not afford us this possibility. It is possible, however, to make comparisons of analogous forces and situations at different times – and often with different players – in order to gauge the return on investment in the current, compared with the previous, kind of military force. Such comparisons can offer a reasonable approximation of the ideal.

With these thoughts and caveats in mind, the following data offer indicators of return on the U.S. military forces’ current investment in precision engagement capability.⁸ Though any one of these data points might not be fully persuasive taken in isolation, taken all together, they add up to a reasonably impressive indication that the investment in transforming the forces has been worthwhile.

Dollar Return on the Investment – the “Macro” Number

Hostilities in the first Gulf War, in 1991, lasted 42 days, at a cost of \$3.6 billion per day. The second Gulf War is still ongoing in the form of an irregular war, but the comparable part of the war – involving major combat between organized forces on both sides – lasted 30 days, from the first bombing sortie to the capture of Tikrit and the area around it, at a cost of \$0.7 billion per day. The reduced daily cost of the more recent campaign, plus the avoided cost of twelve days of campaigning, add up to a saving of \$95.4 billion.

⁸ The data entering the calculations were gleaned from various unclassified sources: some published officially (in the case of the two Gulf Wars and U.S. military costs), some quasi-officially (in regard to the Soviet war in Afghanistan) and some in general publications such as books about previous wars, the Encyclopedia Britannica and news reports.

The cost increment for the precision engagement capability of the 2003 forces (which in principle enabled faster victory at lower cost when compared with the 1970-era forces that fought the first Gulf War), can be estimated, from the above data on cost per person in the military and the size of forces involved, at approximately \$42 billion per year, for personnel and equipment. Very roughly, then, the use of precision engagement in the second Gulf War may be understood to have saved the United States enough money to pay for two years or more of investment in precision engagement.⁹

Cost Per Target Destroyed – the “Micro” Number

Fewer than ten percent of the air-delivered weapons in the first Gulf War were precision-guided, compared with about 70 percent in the second Gulf War. Unofficial Service data indicate that approximately 21,500 targets were attacked from the air in the first Gulf War, versus 46,000 targets in the organized combat portion of the second. If the reasonable supposition is made, in the absence of firm data, that the parts of the two wars carried out by the air forces absorbed half of the above-mentioned total war costs, and if it is assumed that all the targets attacked were destroyed, then the cost per air-attack target destroyed in the first Gulf War was \$3.2 million, and the cost per air-attack target destroyed in the second Gulf War was \$0.22 million. This represents nearly a 15-fold reduction in cost per air-attack target destroyed from the first conflict to the second.¹⁰ The difference thus seems marked enough to overcome the uncertainties introduced by the assumptions entering the calculation.

Length of War, Size of Forces and Military Casualties

The United States in 2001 and the Soviet Union, from 1979 to 1988, took on similar forces in Afghanistan. The Afghans' number was estimated at about 40,000 loosely organized resistance fighters in the Soviet war, and in the absence of published official estimates, it seems reasonable to assume the numbers were about the same in 2001. The Soviets had about 100,000 military personnel engaged most of the time; their war lasted nine years and they suffered 15,000 killed in action. Ultimately, the Soviets' war was unsuccessful and they withdrew, leaving the Afghan factions to split apart and fight amongst themselves until the Taliban gained the ascendancy.

The United States engaged the Taliban regime and their *al Qaeda* allies with about 10,000 military personnel and defeated them in two-and-one-half months, at a cost of about 100 killed in action. This enabled the establishment of a new governing regime that, while it is not yet fully established, bids fair to become a reasonable success. One substantial difference between the two conflicts was the U.S. ability to enlist groups hostile to the Taliban and support them with its precision engagement capability. There were also significant political differences, but the superiority of the new U.S. kind of military operation over the upgraded World War II-type operations of the Soviets was the decisive factor in engagement details and outcomes.

⁹ The issue of what to do with such savings will be taken up later in this paper.

¹⁰ There was a similar array of targets in the two wars.

Civilian Casualties

Attacks on cities in any war during the pre-occupation stages of combat, or even when no occupation is anticipated, have the purpose of degrading or destroying the resources within the cities that support their countries' side of the war effort. In the days before precision bombing – the ability to destroy a single building with a single weapon – was possible, free-fall bombs following ballistic trajectories were scattered in a wide probabilistic pattern, with half of the weapons falling, at best, within a circle 300 feet (and often as much as fractions of a mile) in diameter around the target(s). The other half would end up scattered much more widely outside that circle. Such bombing created much incidental damage and many incidental civilian casualties.

The scatter pattern of precision air-to-surface munitions is far smaller, meaning that, except for a small percentage whose guidance systems fail under stress, such weapons can be relied upon to hit their targets every time. Thus, the number of nearby civilians hurt in the process of eliminating a significant military target today will be correspondingly smaller than it would have been in the past.

To illustrate the difference, consider the Allied bombing of Dresden in World War II, as compared with the bombing of Belgrade in the 1999 war over Kosovo. The targets in Dresden were industries that produced radio, electrical, optical and photographic equipment and machine tools. The bombing campaign consisted of a few massive carpet-bombing raids around the target areas. The city was largely destroyed and somewhere between 35,000 and 135,000 people were killed (estimates vary). The civilian deaths represented between seven and 27 percent of the city's population.

The targets in Belgrade were electric power installations, military barracks, bridges, television towers and other transportation and communication nodes and links. There was not a great amount of incidental destruction, and incidental civilian deaths were estimated to number somewhere between a few tens and the low hundreds, representing approximately 0.01 percent of the population. Similar numbers of civilians were killed in the bombing of Baghdad during the second Gulf War, involving not dissimilar targets. The Iraqi claim of civilian dead was 1,250, which would still represent very much less than 0.01 percent of the city's population.

Thus, precision engagement has drastically reduced the risk to civilians caught in hostilities between organized forces contending for control of a nation or part of one – to the point where a single civilian casualty resulting from military action may now constitute news and even generate political repercussions. Indeed, in modern wars of the kind typified by the Gulf and Balkan wars, operations reminiscent of the attack on Dresden would not even be considered; precision engagement has reinvigorated attention to humanitarian concerns in war zones, at least on the part of the United States and its allies.

As an incidental but not negligible matter, if a winning combatant is now destined to help in the reconstruction of areas where it has engaged in military hostilities (as appears to have been true of most such cases since the end of the Cold War), precision engagement would

seem likely to generate increasing return on investment because it minimizes incidental damage, and therefore also the cost that is ultimately paid for victory.

IV. The Remaining Challenges & Tasks of Force Transformation

The transformation of the U.S. military has changed the humanitarian, political and economic aspects of conflict when military measures are indeed taken to resolve it. One ought to welcome and thus adapt to the changes in the first two areas of appraisal, and perhaps capitalize on the third – the financial benefits of precision engagement. But the United States cannot pocket the various returns on its investment just yet because these must be used both to complete the transformation of its forces (in ways that will be discussed below) and to offset and counter the vulnerabilities attending its new approach to warfare – vulnerabilities that have been too often overlooked in the expressions of general admiration for the performance of the U.S. military in its most recent engagements.

Identifying and Reducing Vulnerabilities

As is the case in many other contexts, the key vulnerabilities of the U.S. military stem from the fundamentals of its organization and modes of combat. The most critical of the vulnerabilities attending the new configurations of the U.S. military forces in their new operational modes and organizations are:

- The targeting network and guidance systems of the United States' most lethal weapons depend heavily on observation from above: from the air, from space and by seekers embedded in the weapons themselves. The use of cover, concealment and deception by the opposition can make it difficult to find and destroy the targets on whose destruction success in battle may depend. Serb tanks hiding in haystacks at night during the Kosovo campaign are a crude example of this vulnerability.
- It is obvious to all how heavily the United States and many of its allies depend on communication networks to manage highly dispersed operations and to relay, within very tight time requirements, targeting and other data to processing centers and to the forces engaged in combat. It is a near certainty that future opponents will expend great effort trying to disrupt these communications.
- The ability of U.S. airpower to transport ground forces, find and designate targets and then deliver ordnance against them is essential to U.S. precision engagement capability and therefore begs for counterattack. In recent conflicts the power of the targeting network has combined with military aviation to sweep any air- or ground-based high-altitude resistance from the battlefield. As a result, U.S. aviation has been vulnerable to attack only when helicopters have operated near the ground or when transport and combat aircraft have had to approach the ground for takeoff or landing at airfields accessible to hostile fire. Not surprisingly, the main firepower of U.S. forces is generally delivered from the sanctuary above 10,000 to 15,000 feet, or well beyond the range of (now) ubiquitous shoulder-fired antiaircraft missiles. However, the Soviet Union, before its collapse, had fielded long-range, high-altitude antiaircraft missile systems capable of

denying that sanctuary. These systems were designed to engage stealthy combat aircraft, though they are also capable of destroying surveillance and targeting aircraft many tens of miles, and up to more than a hundred miles, from the immediate battle area. They are currently in the inventories of some countries that could become military adversaries and they are for sale to any willing buyer, so the United States must consider the possibility that they will appear in areas where U.S. and allied forces may be engaged in the future.

- When U.S. and allied forces along with their logistic support, heavy weapons and vehicles reach a certain size, they cannot be entirely transported by air, but must enter a given theater of war from the sea, through ports adjacent to hostile territory or “over the beach.” The corresponding sea lines of supply are vulnerable to attack by quiet, non-nuclear submarines, which are proliferating around the world. Moreover, the ports housing U.S. ships and military stores can be attacked by terrorists, or by SCUD-like missiles, mines or other weapons available to opponents.
- U.S. forces are now designed to achieve quick victories against organized armies, navies and air forces. And nothing succeeds like early success in a short war to put to rest any political controversy engendered by that war. By contrast, long wars are much more likely to fail in achieving their objectives – in part for political reasons related to their very length (as the Vietnam and Afghan wars illustrated to the United States and the Soviet Union, respectively). As such, though an opponent’s regular forces might quickly collapse under an onslaught like the one that took Baghdad in less than a month from a standing start, remaining opposition elements might still pursue victory by continuing the conflict at length with irregular forces operating in a guerrilla or terrorist mode. An opponent could thus deny the fruits of a quick victory while creating the stresses of a long war, despite the impressive strength of the U.S. armed forces. This vulnerability is well illustrated by the continuing and increasing political controversy in the United States that has been engendered by persistent insecurity and conflict in Iraq.

All of these vulnerabilities – except the last – can be mitigated or overcome by technical means. But doing so will require resources. Some or all of the resources that have been (and will be) saved through precision engagement-oriented transformation of the military forces can be made available for this purpose, depending on the nature of the potential opposition that the United States and its allies are likely to encounter.

First, it should be noted that the additional resource expenditure suggested above will have to be a continuing expenditure. As soon as the United States and its allies move to reduce a technical vulnerability – for example, by using stealth technology in military aviation systems or by using elaborate electronic design measures to protect communication, space surveillance and navigation systems – prospective opponents will start changing their own approaches and systems to meet and to try to overcome, again, the changes that have been made. The cost of participation in this contest must therefore be considered as part of the overall cost of meeting both potential adversaries’ regular forces in the field and the challenge of “asymmetric threats.” The latter include both those who could convert rapid U.S. military victories into lengthy irregular wars of attrition and the perpetrators of

transnational terrorism aimed at striking the United States through attacks on its people, allies and heartland.¹¹

These prospects would seem to support a bifurcated future for the U.S. armed forces: completion of their transformation to deal with other regular armed forces and the addition of necessary capabilities – many of which are not ordinarily thought of as military functions – to meet “irregular” threats. Let us review the essential elements of each of these areas separately, and then consider their strategic implications for the armed forces and the country as a whole.

U.S. Force Transformation to Deal with Organized Military Forces

As the United States completes the transformation of its military to fight other regular armed forces, it is in a position to move so far ahead of any such potential opposition that it could well obviate the effectiveness of technical countermeasures against its forces for a long time to come. This will require the allocation of significant resources “up front”, as will be established immediately below.

Many who are concerned about the growth of the U.S. defense budget advocate leaving U.S. forces largely in their current form and meeting any countermeasures with counter-countermeasures. Whatever the short-term benefits that such a strategy might confer, it is ultimately undesirable because it does not achieve the fundamental objective of moving the United States as far ahead of potential opposition as possible. By contrast, the more aggressive approach can achieve that lead, though it will entail completion of many major systems currently in development along with a few that have yet to be started, many of which are at the heart of controversies as to their utility and necessity in the post-Cold War world.

Completing Systems Currently in Development

Among the major systems in development that would need to be completed to realize the current vision of transformation are, *inter alia*, the U.S. Army’s Future Combat System of lighter-weight, more agile combat vehicles and ground combat weapon systems; the Navy’s new DD(X) destroyer and Virginia-class attack submarine; the Air Force’s F-22 fighter and a new tanker aircraft; the Marines’ new V-22 tilt-rotor vertical-takeoff airlifter, along with the LPD-17 amphibious warfare ship that the Navy is acquiring for them; and the multi-Service F-35 Joint Strike Fighter aircraft. And though this has not yet been fully recognized or accepted, it is highly likely that the United States will have to invest in a costly new type of logistic ship, in keeping with the Navy’s still-developing approach of basing logistic support largely at sea instead of on land bases that may take excessive time to establish and that are politically and physically vulnerable. Such a ship would require the cargo capacity of today’s maritime pre-positioning ships, with enough space on board to move containers about and to break them down into pallets. It would also have to incorporate a flight deck for air

¹¹ These threats have been called “asymmetric” because they do not use the military techniques that regular armed forces, such as those of the United States, do, but rather try to exploit both the vulnerabilities of such forces (some of which are noted above) and those of whole nations.

transport and some means for loading landing craft or lighters in higher sea states than current technology permits for the purpose.

On-going major system development will also have to include the ship- and land-based anti-ballistic missile systems that are already under development to meet the threat from theater ballistic missiles being built by many potentially hostile countries. That threat can soon be expected to include guided anti-ship ballistic missile warheads that would – by targeting both warships and the logistic ships that bring up the materiel to support forces ashore – jeopardize the U.S. command of the seas, upon which all its military plans and national strategies depend.

To this array of major new systems must be added extensive augmentations and improvements to – and joint Service integration of – networked surveillance, targeting and communications systems, both to deal with the flaws in the current combat information network and to continue perfecting new approaches to precision engagement under the Network-Centric Warfare paradigm. Such improvements to the warfare information network must also be extended into the relevant subsystems of the major platform system developments already discussed.

The improvements advocated above will likewise entail investment in some expensive combat or quasi-combat systems. Among these are the Predator and Global Hawk high altitude; long-endurance unpiloted surveillance aircraft that are in use today; unmanned combat air vehicles designed to carry out especially hazardous missions such as attacking and destroying the most effective long-range, ground-based air defenses; the manned radar and electronic surveillance aircraft that also function as elaborate airborne command centers; and many kinds of spacecraft, such as an advanced space-based radar and a jamming-resistant successor to the current GPS (Global Positioning System).

Addressing Questions of Utility and Necessity

While there has been little argument about the need to improve and enhance the combat information network, there have been extensive arguments about the need for some or all of the new and advanced platforms – aircraft, ships, ground combat vehicles – that carry and deliver weapons or mount the components of the combat information network. The arguments differ among the systems in contention, but they all have common threads of objection – chiefly, to their high cost, and in support of that, the claim that many advanced systems are in any event unnecessary because they were designed to meet the sophisticated and advanced Soviet threat, which no longer exists. But such arguments fail to account for certain realities.

First, though they are perhaps less militarily advanced than were the Soviets at the end of the Cold War, many potential opponents of the United States are nevertheless able to field formidable armed forces. For example, North Korea remains an enigmatic but powerful threat to the United States' South Korean ally. Moreover, as North Korea appears to be continually improving its nuclear weapons capability (as well as the long-range missiles to deliver such weapons) it also becomes a threat to Japan and other U.S. allies in the Pacific region. Absent wise and careful threat management – and deterrence – on the part of the

United States, including the fielding of military forces clearly able to meet North Korea in battle, the latter's growing capabilities could cause Japan to review and modify the constitution that now keeps in check the growth of its offensive military capability, including the possible development of nuclear weapons.

Another example of potentially potent opposition is China. Though it is now friendly in a guarded sort of way, China could easily become a military opponent of the United States in the context of a crisis over Taiwan. That situation could blow up at any time because of a misunderstanding of the position of any of the three principals (China, Taiwan and the United States) or a perception of weakness on one end or the other of this precarious balance.

Of equal if not deeper concern is the fact that, as has been noted above, many of the United States' potential opponents are actively acquiring advanced Soviet-era systems, such as theater ballistic missiles, long-range air defenses, highly maneuverable interceptor and ground attack aircraft and modern quiet submarines, all of which can exploit the vulnerabilities of U.S. forces. And one must certainly expect that a nation like China – benefiting from a fast-growing, technology-based economy – will soon be able to field its own versions of such systems.

The above examples of possible military conflict, together with others that might arise suddenly in the arc of instability reaching from North Africa to the Middle East, South and Central Asia and even the Korean Peninsula – along with the evident technological progress being made by several potential U.S. adversaries through third-party acquisition and/or national development – argue for the maintenance of the most advanced, versatile systems possible on the part of the United States.¹² The current military systems of the United States are certainly able to match those of potential opponents today, but that precarious balance would almost certainly change if the U.S. military were to rest on its laurels. Unhappily, the first sign that a change in the strategic balance had occurred could well be a U.S. defeat on the battlefield.

It is also necessary to remember that the United States' highly developed military capabilities have figured strongly in overcoming even primitive resistance quickly – including, for example, the Taliban and the essentially World War II-equipped Iraqi armed forces of Saddam Hussein. Based on the Iranian example in Iraq and the Soviet example in Afghanistan, less advanced forces than those of the United States would likely have had a much more difficult time achieving the same objectives. Should the United States continue to advance both its military systems and concomitant personnel training, the “existential deterrence” value of its forces (simply the knowledge of U.S. military strength and resolve) will be sustained. By preserving its status as the “big kid on the block”, the United States may well forestall attacks that would otherwise require difficult and costly efforts to repel, while remaining prepared to deal decisively with any challenges that do arise.

¹² Other examples of possible future conflicts were given earlier, as part of the comparison of resources expended for military forces by the United States and potential opponents.

A second line of argument used to oppose the continuing development of modern systems is that an alert U.S. military will be able to perceive and respond to changing threats as and when they arise. Yet this reasoning ignores the fundamental fact that it takes a long time – on the order of two or three decades – to field major new military systems, whereas the strategic and military need for such systems can arise over the course of a few months, a year or two, or even as a total surprise (as the United States learned at Pearl Harbor and feared throughout the Cold War). Additionally, the U.S. military industrial base has shrunk – through consolidation and outright reduction after the Cold War – to a few major system integrators with a lower tier of suppliers who, with their engineering and production staffs, can only be kept effective through continuous work. As the United States learned on entering World War II (and as is now well recognized to be the case), it can take years to ramp up a design and production base that has been allowed to wither.

All attempts to evade the realities outlined above face significant difficulties (though these have not always been recognized). It has been proposed, for example, that new system development be limited to prototypes that can then be put into production if and when necessary. But, as is being illustrated even today with the F-35 Joint Strike Fighter, there is a long path between the design and building of a prototype and the serial production of a fully militarized system. The military aspects of a given system design must be finalized and the production plan and machinery designed and built. As a result, the final product often turns out to be quite different from its corresponding prototype. The F-35 is already three years into this process, and the process is far from complete.

Another argument aimed at avoiding the full development and fielding of new systems has been that one need only produce a small number of a given weapon system initially, to set the stage for larger-scale production if needed. However, because the price of every system unit produced must include a share of the total cost of the research, development, testing and production tooling that brought the system into being, smaller production quantities mean a higher per unit cost. As was the case with systems such as the B-2 bomber and the F-22 fighter, high unit cost alone can come to be viewed as prohibitive or can become an economic and political issue that eventually leads to increased calls for system cancellation.

Thus, ironically, if the desire to save money by reducing the quantity of a given weapon system to be acquired leads to total system cancellation because of daunting unit costs, all the expenditures associated with the system up to the cancellation date – possibly totaling many billions of dollars – then have to be written off.¹³ Additionally, there is no guarantee that even the cancellation of an expensive new system will reduce future expenditure in the overall Service or Defense budgets. The U.S. Army, for example, cancelled its Comanche combat helicopter after nearly twenty years of development and expense, for the reason that it no longer needed the aircraft, given that the conditions occasioned by the Soviet threat had gone away. But rather than reduce future expenditures – in the amount saved by the termination of the Comanche program – the Army partly justified the cancellation by arguing that it would free up the money needed to modernize its existing helicopter fleet and to advance its Future Combat System.

¹³ This does not refer to system cancellations that occur because the system developers are said not to be performing as promised, as happened when the Navy's A-12 attack aircraft was cancelled.

Transformation to Deal with Irregular Forces & Terrorist Opposition

As indicated earlier, having the strong conventional capabilities outlined here will contribute one part of the progress that must be made to complete the ongoing transformation of U.S. military forces to meet new strategic conditions. The other part requires enhancing the forces' ability to avoid or overcome the persistence of terrorist and guerrilla opposition that can drain rapid military victories of the political and strategic advantages they would otherwise produce.

The Nature of the Threat

Terrorism and guerrilla warfare are two different phenomena that can merge in certain circumstances, as is the case of opposition to U.S. and Coalition forces in Iraq. Guerrilla warfare is a way for weak forces to take on stronger ones. The guerrillas do so by:

- Attacking the stronger forces at times and places in which their guard is down;
- Attacking where the stronger forces are locally outnumbered or can be easily ambushed;
- Attacking the infrastructure on which the stronger forces depend for their security; and
- Going after the infrastructure and institutions on which the population supported and protected by the stronger forces depends for its livelihood and welfare.

While sharing with guerrilla movements the need to overcome much stronger opposition, the term “terrorism” marks a different strategic phenomenon. A guerrilla “army” tends to be a well-organized, if largely covert, irregular fighting force oriented toward its local situation and intent on changing that situation. The terrorists of most concern to the United States and its allies, however, are internationally-oriented. They represent a loosely-organized but centrally-inspired transnational force, drawn largely – though not exclusively – from the radical right wing of Islamic societies in conflict with themselves over issues of modernization and the concomitant question of how much Western influence to admit into that process. The intent of these terrorists is to keep such (in their view, corrupting, Western) influences out of the “Islamic World” by attacking the United States and others wherever they are vulnerable in the hope that they will then withdraw their presence – thus leaving key areas open to subsequent takeover by the religious extremists.

An additional, tactical distinction between the two groups is that while guerrillas focus on local infrastructure and armed forces, terrorists tend to focus almost exclusively on people, and civilians especially. In particular, terrorists will try to kill as many nationals of targeted countries as possible in the hope of coercing those (mainly Western, developed) countries into retreat from their international posture. As one of their main tactics, the terrorists seek to manipulate the West's high valuation of human life – and its attendant self-imposed constraints on military and other action – to create, in areas where there is a strong U.S. or other Western presence¹⁴, pressure to reduce that presence, within the United States, among allied countries and locally. Terrorists know that their actions will resonate in the Western news media, thus amplifying their message.

¹⁴ Such a presence might come in the form of military bases, embassies or simply large tourist attractions with many Western or U.S. visitors.

Terrorists therefore tend to perpetrate attacks against Western civilians in places where many local people will also be killed, as was the case in the East African Embassy and Bali nightclub bombings. Moreover, they deliberately set up situations in which the West, in an attempt to defend itself, would have to risk killing innocent civilians or insulting local religious sensibilities. For example, terrorists fire at U.S. troops from the middle of a crowd with the intent to draw return fire. Similarly, they will often set up weapon positions in mosques or temples to draw fire on these community, national or religious symbols. Such tactics often succeed in raising opposition to the West's – and especially the U.S. – presence in the local area. Indeed, it is approaches such as these, which were honed by the Viet Cong in Vietnam in the 1960s and 70s (and which have been used more recently in Somalia, Iraq and the Israeli-Palestinian conflict), that evidence the merging of the interests and tactics of terrorist and guerrilla groups.

Countering the Threat

To meet the guerrilla and terrorist threat, intelligence is key. In part, the intelligence capability is already in the armed forces, but much military intelligence tends to be oriented toward order of battle. Substantial additional intelligence can be gained on the ground if the local population is disposed to provide it. To create the conditions in which that will happen, it is necessary to understand the local culture, and to encourage a discourse with the local population that will lead to such intelligence, in ways that will be indicated shortly.

Before a campaign is undertaken, it is necessary to understand the opponents' view of the world and therefore the kinds of tactics they may use – to try to think as they do. Western planners will have to set aside the norms of their own cultures and try to peer through a prism of local beliefs, behaviors and mores.

Mechanisms to improve the ability of U.S. forces to anticipate likely opposition methods and targets have been proposed in the past, and could be reinforced as part of a U.S. national military strategy. For example, in a 1997 report to the Navy on *Post Cold War Conflict Deterrence*, the Naval Studies Board of the National Academies and the National Research Council proposed the creation of what was called a group of “strategic worriers.” This group of thinkers would be steeped in the local history and cultures of the places where U.S. strategic planners believe they must be prepared for a potential eruption of hostilities. Their mission would be to “get into the opponents' heads” and present to military planners a culture-specific projection of the kinds of strategic and tactical thinking on the part of ongoing or potential opposition with which U.S. and allied forces might have to contend.

Once Western forces are on the ground, defeating terrorist and guerrilla opposition requires:

- Protecting the local population and infrastructure;
- Finding, attacking and defeating the guerrilla and terrorist groups; and
- Changing the adverse conditions that prompt members of the local population to support violent opposition in the first place.

Since it is impossible, by observation alone, to identify the terrorists and guerrillas embedded within an innocent civilian population, local intelligence will be essential to protecting

civilians and going after violent opposition. The precision engagement capability that will have proven so effective in the defeat of regular forces will also reduce harm to local civilians, perhaps reducing the extent of ill-will that might lead them to support terrorist and guerrilla groups. After measures have been taken to restore order and security, as will be discussed shortly, the flow of intelligence from that population may then be expected to increase. To capitalize on this, U.S. and allied forces on the spot will need enough knowledge of the local area, language(s), culture and practices to enable them to relate to the population and to work with friendly local authorities and military units.¹⁵ On occasion, to secure the support of the local population, it may even be necessary – as we have recently seen in battles in Najaf, Iraq – to allow guerrillas and terrorists temporary sanctuary in crowds or sacred places, thereby minimizing both damage to shrines and the risk of civilian casualties.

Whereas local intelligence and actions are essential to the first two requirements for defeating guerrilla and terrorist opposition – protecting the population and going after the irregulars – changing the underlying reasons that lead the population to support them in the first place may also involve actions of much greater scope. In particular, it requires different approaches with respect to the two types of opposition groups. For if most terrorists (as compared with most guerrillas) are outsiders who have involved themselves in a local conflict primarily because it offers them an opportunity to strike at U.S. and other allied forces, then local initiatives and counter-attacks will have only a relatively modest impact on their capabilities and resolve. Rather, defeating such terrorists is a national task that begins in Washington, involving as it does both the United States' global foreign policy and its presence and participation in the world economy.

Gaining the Local Population's Support

What might a local population want after its army has been defeated and its cities and countryside effectively overrun by U.S. and allied forces?

Once local populations become convinced by the victorious force's immediate actions that that force is neither unremittingly hostile nor unduly repressive, they will look to return to the ordinary business of daily living: doing useful work and getting paid for it; running a local government with the power to make significant decisions affecting local people; and maintaining an infrastructure that works – including roads, bridges, communications, electricity, water, food, schools, medical care and so forth. Rebuilding or salvaging such infrastructure may require specialized components of the U.S. armed forces to perform many of the construction tasks that would, in other circumstances, be the province of civilian engineering and logistics firms, either local or brought in from the outside. To carry out such tasks the U.S. armed forces will need both the means to establish and support local government and the ability to communicate amicably, directly and in culturally-appropriate ways with the local population and its leaders. By helping the local population adjust to its new situation rapidly, U.S. and allied forces can reduce support for guerrillas – drying up the sea in which they swim, in Mao Zedong's famous analogy. It might even induce many guerrillas to give up the fight. Given the more global motivation (and long-term vision) of

¹⁵ Allowance must also be made for the fact that local intelligence organizations may sometimes be inept or dependent on inefficient or corrupt local authorities.

transnational terrorists operating in a given local area, they and their supporters are unlikely to be influenced in the same way. Still, the actions of U.S. and allied forces may well increase the flow of intelligence from the populace, eventually helping them to defeat the terrorists locally.

To effectively minimize or obviate the potential of residual opposition to turn quick military victories into long wars of attrition – attrition of wills as well as people and resources – the U.S. military will have to be expanded to include capacities for establishing post-conflict governance, police-oriented security, military security and infrastructure engineering and construction. Performing such diverse tasks as these will in turn require a well educated and highly disciplined force. Any such force will likely have to include special units – perhaps drawn from the Special Operations Forces – who are trained for work with local populations and some of whom might already have had interaction with the local population as part of their mission; from the military police; and from the combat engineers, whose skills can be expanded to include such things as restoring a national electricity grid. By virtue of their specific focus on local populations and cultures, the tasks outlined above can be viewed as yet another facet of “precision engagement,” taken in the broadest possible sense. They also fall under the controversial rubrics of peacekeeping and nation-building.

Why the U.S. Military?

Since all of the needs and tasks sketched above for local post-conflict peacekeeping and reconstruction will add to the resource needs of the military – in terms of size, breadth of training and cost – and will expand their already broad mission spectrum, the question arises: why load all of that onto the military in the first place? The answer is several-fold. As a practical matter, having defeated opposing armed forces on the ground, U.S. or allied military forces will already be in the places where security, peacekeeping and reconstruction are needed. If they are not, or if they lack sufficient numbers, the military can move the necessary forces in quickly. The military is trained, disciplined and able to marshal a wide variety of resources. And, they can fight if need be. No civilian organization (or group of organizations) can handle that range of tasks and scenarios as effectively. But even if they could, civilian organizations trying to operate in a post-conflict situation characterized by guerrilla or terrorist violence will require a military presence for protection, while performing the functions outlined above, of necessity more slowly and probably less efficiently than could the military on its own. This has been among the lessons learned by the United States in Afghanistan and Iraq.

On the assumption that in applicable future conflicts, the United States will have acted in conjunction with allies, the question may also arise as to whether those allies should be asked to take on substantial – or even primary – responsibility for the nation-building and peacekeeping tasks, especially in cases where the United States shoulders much of the traditional warfare burden. Certainly, there will be instances in which some of the United States’ many allies have better knowledge of the relevant local culture and language(s). And, in general, allied contributions would represent valuable force augmentation that is *ab initio* cost free for the United States. It thus stands to reason that the United States should seek such help, as is currently the case with coalition forces in Iraq. For example, British contingents are operating in the city of Basra while U.S. troops work to maintain order in the

Sunni Triangle and in rebellious Shia strongholds. Still, there will inevitably be times when U.S. forces must carry the entire weight of post-conflict operations – either before allied help can arrive or in sectors of a country that the United States controls exclusively. U.S. forces will therefore have to be prepared to carry out peacekeeping, stabilization and reconstruction missions.

V. The Ultimate Goal: Preparedness for Whatever Lies Ahead

The architects of transformation (and U.S. taxpayers) can take comfort in the fact that the transformation of the U.S. military that has been accomplished thus far has given it new capabilities that enable smaller forces to perform traditional tasks more efficiently and effectively. However, as the preceding discussion has indicated, there is much more to be done, involving matters of strategy, resources and risk as the United States faces future strategic challenges, both known and currently unknown.

Anticipating Future Needs and Identifying Strategies

At base, it is reasonable to assume that the United States intends to sustain its structure of alliances and its engagement in the global economy. In order to meet military threats to its allies and overseas presence, as well as non-military threats emanating from transnational terrorist organizations like *al Qaeda*, the United States will have to maintain a strong worldwide posture.

That the broad deployment and commitments of U.S. forces will sometimes lead to armed conflict – and to attendant post-conflict challenges – is a given. Thus the questions: to be as well-prepared as possible for a wide range of contingencies, how large should the U.S. armed forces be? What capabilities will they need to have? After the end of the Cold War and until recently, the national military strategy called for the United States' armed forces to be large and strong enough to engage in two major regional conflicts at the same time. That would have been analogous, for example, to fighting the Vietnam War or the first Gulf War while engaged in a major conflict on the Korean Peninsula (and without further mobilization). That goal was abandoned as impractical.

Implications of New National Military Strategy

The new military strategy calls for U.S. forces to be able to protect the United States' homeland, deter conflict in four overseas theaters, halt aggression in two of them and win decisively in one of the last two – all at the same time. Depending on the means and resources used for deterrence, this new strategy may prove more viable than the last, not least because, along with a mix of national air and missile defenses, the difficult homeland security component has now been taken up by the Department of Homeland Security. Under this strategy, should a major conflict arise while a large part of the U.S. military is already committed (as, for example, is currently the case in Iraq), the United States might have to rely on a combination of Special Operations Forces and air power to stop a second aggression, while remaining vigilant against possible terrorist or strategic missile attacks at home.

Even given this new strategy – and assuming the continuing transformation of the military – there will be no guarantee of success in avoiding extensive military conflict that stretches U.S. forces to the limit or beyond. Much will depend on many elements of chance. When might existential deterrence fail? Would moving a Carrier Strike Group offshore from a precarious standoff on land prevent latent conflict from erupting into open warfare or further inflame tensions? Will the amphibious forces of an Expeditionary Strike Group (ESG) be available when needed? All such questions of chance will be affected by issues of resource commitments and risk.

Paying for On-Going and Future Force Development

How much will continued transformation of the U.S. armed forces (and the associated additions they will need) cost, and how will it be paid for? The case has been argued, above, that it would be penny-wise and pound-foolish to stand down on improving and replacing the major combat systems of the military services.

Sustaining the ongoing process of transformation has led to a U.S. defense budget on the order of \$400 billion and more, excluding the operating costs of the conflicts in Iraq and Afghanistan. The needs and tasks sketched above for local post-conflict peacekeeping and reconstruction will likewise require substantial military resources. An accurate estimate of how much money will have to be added to current allocations would require a careful review of capabilities already in the services. For example, as has been noted, some necessary capability is already embedded in the active military forces in the form of Special Operations Forces – trained to work with local forces and populations – and the combat engineers of all the Services. Some augmentation of the engineers to deal with restoring civilian infrastructure might be needed, and active-duty civil affairs units including military government, police and related functions will have to be added. If the equivalent of about one battalion per Army and Marine Division were to be required to cover all contingencies, the cost might come to between \$2 and \$3 billion per year; if only deployed forces were considered, the cost could be less.¹⁶

The United States' defense budget increased by about eight percent in real terms between the fiscal year ending in September 2002 and the one that ended in September 2004. The Defense Department projects that the budget will grow between two and three percent per year over the next several years. That small annual percentage increase translates to around \$10 billion per year. With over \$400 billion going into Defense each year, the amount required for additional, more specialized forces and their training could probably be covered by the few billion dollar difference between what the Defense Department asks for and what Congress authorizes and appropriates. However, the addition of even a few billion dollars to

¹⁶ The notion that U.S. forces may have to be assigned peacekeeping and nation-building duties as part of future operations, essential as those duties are, is frowned upon by the current administration – not least because such duties occupy fighting forces that could otherwise be confronting organized enemy combatants in another theater or training at home for future such contingencies. One response to this objection, as suggested in the foregoing cost estimate, would be the creation of units specialized in the necessary tasks and assigned to take over from the major combat forces after the traditional military component of a campaign is complete. Alternatively, fighting forces could be cross-trained to handle the peacekeeping and nation-building tasks (and also sufficiently expanded) so that some of their strength could be set aside for such purposes, perhaps on a rotating basis.

the budget – regardless of the fact that that represents only a small fraction of the current budget – would not be taken lightly by either Congress or the public, nor should it be.

Over the next half-decade or so, the growth of the U.S. Defense budget may reach a point at which there is a backlash on the part of a majority of legislators and the general public, given that other important priorities, including homeland security, social programs and sustaining U.S. economic development will continue to compete for scarce resources. At that point pressures will increase greatly to save money by canceling one or another of the major systems, which tend to be viewed in many circles as Cold War carry-overs. Then it will be up to the President and defense officials to persuade both Congress and the public that the approach to force transformation recommended here will be far cheaper in the long run, because it will enable the country to stay ahead of possible military opposition instead of having to catch up after the United States has been left with an atrophied military-industrial base (which would then have to be reconstituted at great expense and over precious time to meet rapidly emerging threats or crises).

The argument will have to be made persuasively that the advanced U.S. systems will represent a continuation of the exchange of expensive capital equipment for also-costly labor that has given U.S. forces the edge they have displayed over all other forces in the world. For example, the U.S. Navy's new destroyer is being designed to operate with a crew about a third the size of that needed to run the current DDG-51 class destroyer. This argument will also have to emphasize the fact that, as has been indicated previously, the more modern U.S. weapons and weapons platforms will put U.S. forces a generation ahead of both the Russian-designed anti-aircraft and anti-ship systems currently being fielded by potential opponents and the more advanced systems, such as guided anti-ship ballistic missile warheads, that can easily be derived from the current versions. Moreover, it must be made apparent that if the United States continues to modernize its forces this way, their "existential deterrence" value can only be enhanced rather than eroded, as would happen if potential enemies were to observe U.S. forces aging in place without continual modernization. The investment might then be likened to the familiar example of purchasing life insurance while hoping that it will never have to be used.

Issues of Strategy

Meeting and defeating the variety of threats now facing the United States will, as emphasized in all the prior discussion, require anticipating future opposition, completing the military's current phase of force transformation and committing to a cycle of continual renewal and modernization. It will also require balancing the capital-for-labor exchanges, which characterized transformation of the forces in the first place, with the need to add and train specialized personnel (at significant cost) to counter emerging asymmetric opposition. Moreover, the United States is more likely to achieve its goals by pursuing them in cooperation with allies facing – or likely to face – similar problems. This means that only an integrated, long-term and global strategy of force development and utilization will be able to equip and support the U.S. military as it faces whatever lies ahead.

It may be decided, as Congress and the public become involved in planning such a strategy, that significant savings must be achieved in defense expenditures to help meet other pressing national needs, and that such savings can be gained by foregoing some of the advanced technical systems about which there is continuing controversy. The arguments would be made that those savings would free money to pay for the additions needed to enhance the forces' ability to deal with the irregular phases of a conflict and perhaps also make resources available to shift to other areas of national need.

It would be found, however, that cancellation of a major system saves only a percent or two of the annual defense budget over the years of system development, depending on the actual stage of development or production of the system when it is cancelled. For example, canceling a typical \$40 billion system might save between a few tens or hundreds of millions of dollars per year if the system is in the early stages of development, while if it is in production, the savings could rise to one or two billion dollars per year. This could indeed be used to help offset the cost of beefing up the forces' ability to deal with irregular warfare, in ways described previously, but it probably would not cover all of that cost, and none would remain to be shifted to other uses. Experience shows that such a result would lead to calls for additional system cancellations, to make more resources available. In the meantime, the long-term ability of the military to deal with the organized forces of potential opposition would have been reduced, to an extent that is currently unknowable.

If systems are not cancelled, one can hope that the ongoing substitutions of capital for labor inherent in new system acquisitions will reduce costs. However, that will take time – the decades it takes to replace existing systems with new ones that require fewer personnel. Since about half the U.S. defense budget pays for personnel, another way to make significant near-term, or even medium-term, reductions in the defense budget is to reduce the size of the forces. However, it must be recognized that taking such a step would increase the risk of failure in any conflict. And, depending on the nature of the reductions, that increased risk could come either in engagement with opposing regular, organized forces – despite the advantages that precision engagement confers on U.S. and allied forces – or in the phases of conflict with irregular forces that may follow such an engagement. This increased risk may be especially severe if the capability to deal with the irregular phases of a conflict is neglected in continuing the force transformation.

The necessary discussion and development of strategy would benefit enormously from a modest investment to prepare a comprehensive set of lessons learned from recent and currently ongoing conflicts, as an aid to planning the path ahead. As today's planners must understand quite well, the process of force transformation would be only a half-success if it were to prepare the military to face some unknown future challenges only to condemn it to grapple anew with those challenges that are, by way of current experience, coming to be well understood but that could be disregarded or overlooked in future planning.

Contrary to the hopes that emerged when “the Wall” came down, the United States faces and must come to grips with a global strategic environment that is as difficult and dangerous as the one it faced during the Cold War – if not more so. The ongoing force transformation has certainly helped to prepare the United States to meet the military challenges ahead.

However, it is neither complete nor, thus far, entirely sufficient, given the fact that potential opponents are also advancing their forces and given the likelihood that guerrillas and terrorists will continue to try to deny organized military forces the fruits of rapid “traditional” victories.

About the Author

Seymour J. (Sy) Deitchman is a private consultant on national security, research and development management and systems evaluation matters. A mechanical and aeronautical engineer by training, he served at the Institute for Defense Analyses (IDA) for over 28 years. From 1982 through 1988, he was Vice President for Programs with responsibility for planning and supervising the IDA research program and ensuring its quality and performance. In the Office of the Secretary of Defense in the 1960s, he established and exercised general oversight of the Defense Department's program of R&D support for Southeast Asia operations, and then he organized and managed such programs at the Department's Advanced Research Projects Agency (ARPA). Before that he held several technical positions that included work on the aerodynamics of the earliest military jet aircraft, air traffic control and the early phases of army air-mobile forces. His personal professional work has covered areas including air and ground transportation, tactical aviation, space systems and many aspects of air, land and naval warfare and strategy. He has been a member of various U.S. government and NATO advisory panels and he was associated with the Atlantic Council as a Councillor for some years after he left IDA. He is currently associated with the Naval Studies Board of the National Academies/National Research Council, having been a member of the Board from 1982 through the 1990s. He is the author of six books and numerous published papers on national security matters.

Annex: Acronyms

ARPA – Advanced Research Projects Agency (U.S. Department of Defense)
C4ISR – Command, Control, Communications, Computers, Intelligence, Surveillance and
Reconnaissance
DDG (51) – Destroyer (Arleigh Burke class)
DD(X) – Destroyer (of any type or of an as yet unspecified type)
DOD – Department of Defense
ESG – Expeditionary Strike Group
FY – Fiscal Year
GPS – Global Positioning System
IDA – Institute for Defense Analyses
JDAM – Joint Direct Attack Munition
LPD (17) – Landing Ship Transport, Dock (San Antonio class)
NATO – North Atlantic Treaty Organization
R&D – Research and Development
RMA – Revolution in Military Affairs
WMD – Weapons of Mass Destruction

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