



Center for Strategic
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Assessments

T E S T I M O N Y

The FY2010 Defense Program

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Introduction

Thank you, Mr. Chairman, for the opportunity to appear before you today, and to share my views on the Defense Department's FY2010 Defense Budget and Program. On balance, I believe Secretary of Defense Gates' recent decisions regarding the Defense Program will improve our overall military posture. However, there are several major outstanding issues that must be addressed before we can fully assess the secretary's decision. First, have we identified the key existing and emerging challenges to our security? Second, how do Secretary Gates and our military leaders see the capabilities in the current program enabling our armed forces to meet these challenges? Third, is this approach affordable, given projected resource constraints? Finally, what role can the defense industrial base play, not only in supplying the needed capabilities in a timely manner, but also as a key U.S. strategic asset?

Existing and Emerging Challenges

In his recent *Foreign Affairs* article, Secretary of Defense Robert Gates stated that the United States needs a more "balanced" U.S. military, one that is better suited for the types of irregular conflicts now being waged in Afghanistan and Iraq. At the same time, he also cautioned that "It would be irresponsible not to think about and prepare for the future" Secretary Gates' admonition is as wise as it is obvious. Have we correctly identified the principal military challenges to our security? Failure to do so could render much of our existing and planned military capabilities "wasting assets." The term "wasting asset" was common among senior U.S. policy makers in the Cold War's early days. Even after its massive demobilization at the end of World War II, the United States possessed an incalculable strategic advantage: a monopoly of nuclear weapons. When the Soviet Union tested its atomic bomb in August 1949, it triggered a sense of urgency and a period of intense effort in the United States to devise a new strategy since its nuclear monopoly was now a wasting asset. These efforts brought together the nation's best strategists and yielded the Truman administration's NSC-68 report and, later, the Eisenhower administration's Solarium Study and NSC 162/2. These in turn laid the foundation for a U.S. strategy to counter a nuclear-armed Soviet Union.

To help offset the loss of this monopoly, the United States sought to develop new advantages while sustaining others: some new capabilities would be needed, as well as different methods of employment. Shortly after the Soviet nuclear test of a fission weapon, President Truman approved plans to develop thermonuclear, or fusion, weapons, with far greater destructive power. During the Cold War the United States also exploited its long-standing relative advantage in technology to maintain a highly effective nuclear deterrent. Faced with a nuclear standoff, equally important were efforts to sustain the U.S. military's unsurpassed ability to project and sustain large forces around the globe. On two occasions, during the Korean and Vietnam Wars, and again during the First Gulf War, the United States transported large field armies approaching a half million troops or more overseas for a significant period of time, enabled by the U.S. military's unfettered access to the global commons, principally the seas and the air but increasingly space and cyberspace as well.

With the Soviet Union's collapse in December 1991, the United States' ability to project military power was effectively unconstrained. Large-scale deployments to Panama, Haiti, and the

Balkans during the 1990s were eclipsed by the dispatch of hundreds of thousands of U.S. troops to Afghanistan and Iraq to topple hostile regimes following the 9/11 attacks on New York and Washington. Throughout the post-Cold War era America's power-projection forces continued underwriting America's security commitments around the globe and assured the security of allies and partners alike.

Several events in recent years, although not as dramatic as the Soviet nuclear test, strongly suggest that traditional methods of projecting power and accessing the global commons, along with perhaps hundreds of billions of dollars of U.S. military equipment, risk becoming wasting assets. The rise of major powers such as China and hostile states such as Iran, combined with the accelerating diffusion of advanced military technologies, is making power projection increasingly difficult. As these trends play out, Washington will likely find it progressively more expensive—and perhaps prohibitively expensive—in both blood and treasure to project power into several areas of vital interest, to include East Asia and the Persian Gulf. Even forces able to deploy forward successfully are liable to find it increasingly difficult to defend what they have been sent to protect. Moreover, the U.S. military's unfettered access to portions of the global commons, especially space and cyberspace, is being challenged.

For some time now it has become apparent that our military will confront increased difficulty in projecting power in maritime chokepoints or in constricted waters like the Persian Gulf. In 1987, toward the end of the Iran-Iraq War, the Reagan administration directed the Navy to protect oil tankers in the Persian Gulf. In May of that year an Iraqi warplane fired two Exocet missiles at the frigate USS *Stark*, killing thirty-seven sailors and severely damaging the ship. In April 1988 the frigate USS *Samuel B. Roberts* was badly damaged by an Iranian mine. A few years later, two more U.S. warships, USS *Tripoli* and USS *Princeton*, suffered severe damage during the First Gulf War after striking primitive Iraqi mines, discouraging American commanders from contemplating an amphibious assault against an insignificant naval power.

These events occurred in a relatively benign environment. The United States was not at war with either Iran or Iraq during its naval escort operations, and Iraq's navy at the time of the First Gulf War was miniscule compared to the U.S. fleet. As later military exercises would show, the risks are far greater when facing an active, clever adversary. Operating in confined waters close to shore significantly reduces the warning time a fleet has to deal with the threat of high-speed, sea-skimming anti-ship cruise missiles. The same can be said of the dangers from high-speed suicide boats packed with explosives that can hide among the many commercial craft plying these waters. Anti-ship mines are both proliferating and becoming far more difficult to detect than those that plagued the U.S. fleet in the First Gulf War. If nothing else, by slowing ships' movement and restricting their maneuverability, mines make them easier prey for missiles and suicide craft. Iran is also looking to master the operation of quiet diesel submarines in the Gulf's noisy waters. All this suggests that the Persian Gulf, the jugular vein of the world's oil supply, risks gradually becoming a "no-go" zone for the U.S. Navy.

The challenge emerging from China to the U.S. military's ability to reassure its allies and friends in East Asia is even more formidable. The Chinese People's Liberation Army (PLA) is aggressively developing capabilities and strategies to degrade the U.S. military's ability to project power into the region. Senior Chinese political and military leaders decided it would be foolhardy to challenge the U.S. military head-on for military dominance. Rather, China would combine western technology with eastern stratagems. To the Chinese, this means seizing the initiative in the event of a conflict by exploiting surprise. This will be accomplished by breaking up the U.S. military's communications networks and launching preemptive attacks to the point where such attacks, or even the threat of such attacks, would raise the costs of U.S. action to prohibitive levels. The Chinese have a name for the set of military capabilities that support this strategic philosophy: "Assassin's Mace" or, in Chinese, *Shashoujian*.

The Assassin's Mace mantra is that such forces enable the "inferior" (China) to defeat the "superior" (the United States). The Chinese effort rests on two pillars. One is developing and fielding what U.S. military analysts refer to as anti-access/area-denial (A2/AD) capabilities. Generally speaking, Chinese anti-access forces seek to deny U.S. forces the ability to operate from forward bases such as Kadena Air Base on Okinawa and Anderson Air Force Base on Guam. The Chinese are fielding large numbers of conventionally armed ballistic missiles capable of striking these air bases with a high degree of accuracy. At present, U.S. defenses against ballistic missile attacks, especially from missiles employing penetration aids, are limited. These defenses can be overwhelmed when confronted with barrage attacks involving large numbers of missiles. The message to the United States and its East Asian allies and partners is clear: China has the means to hold at risk the forward bases from which most U.S. strike aircraft must operate.

Area-denial capabilities are generally directed at restricting the U.S. Navy's freedom of action out to the second island chain, a line that extends from China's coast as far east as Guam. The PLA Navy (PLAN) is investing in submarines to stalk American carriers and the surface warships tasked with protecting them. In 2006 a Chinese submarine emerged in the midst of a U.S. carrier strike group, much to the Americans' embarrassment. The Chinese Navy is emphasizing the production of quiet diesel submarines that can form a "picket line" near the second island chain, silently waiting to ambush an approaching U.S. fleet. It would likely require significant time for an American fleet to reduce Chinese submarine defenses to the point where it could safely advance without risking heavy losses.

The Chinese are relying on more than submarines to support area-denial operations. They are constructing over-the-horizon radars, fielding unmanned aerial vehicles (UAVs), and deploying reconnaissance satellites to detect American surface warships at progressively greater distances, while also enhancing their ability to strike U.S. warships once they are located. PLAN submarines are being equipped with advanced torpedoes and high-speed, sea-skimming anti-ship cruise missiles. The PLA is procuring aircraft that can carry high-speed anti-ship cruise missiles, and fielding ballistic missiles that are capable of striking American carriers at extended ranges. China also possesses advanced anti-ship mines which may limit even further the maneuverability of U.S. naval forces and, by so doing, render them easier to target. Consequently, East Asian waters are slowly but surely becoming a "no-man's land" for American warships, and particularly for aircraft carriers with their short-range strike aircraft.

The same is true of the large air bases in the region that host the U.S. Air Force's short-range strike aircraft. Simply stated, a failure to adapt to this emerging challenge could find large surface warships and "short-legged" aircraft becoming wasting assets. If the U.S. military fails to address this growing problem and the current East Asian military balance becomes increasingly unstable, Beijing might be encouraged to resolve outstanding security issues with Japan, Taiwan and other states through coercion, if not aggression.

Even if the U.S. military overcomes these obstacles to its power-projection forces, it will still find that many of its forward operating bases and other key infrastructures risk becoming wasting assets. Since the Korean War the U.S. military has become used to operating with secure rear areas. Even when U.S. forces have engaged in irregular warfare, large American bases at Camh Ranh Bay in South Vietnam and, more recently, Camp Victory in Iraq and Bagram Air Base in Afghanistan have been relative sanctuaries in the midst of conflict. To be sure, there was the occasional raid or act of sabotage, but the damage inflicted was generally minor. Even insurgent attacks on the Green Zone in Baghdad failed to yield significant harm. This happy state of affairs is almost surely coming to an end.

The Second Lebanon War waged between Hezbollah and Israel during the summer of 2006 is the canary in the Pentagon's mineshaft. The war shows how difficult it is becoming for advanced military forces to defend key fixed targets such as military bases, critical economic infrastructure, and densely populated areas against irregular forces armed with rapidly proliferating "RAMM" (rocket, artillery, mortar and missile) capabilities. During the thirty-four-day conflict Hezbollah fired some four thousand rockets into Israel, most of them short-range and all of them unguided. Yet over three hundred thousand Israeli citizens had to be evacuated from their homes. Israel's oil refinery at Haifa had to reduce its oil inventory and dump oil out of fear that a rocket attack could spark a major explosion and fire in the city.

While Hezbollah's rockets are short-range by modern military standards, some could be fired over fifty miles, a major increase over the mortars and rockets used by Viet Cong guerrillas forty years ago against U.S. bases in South Vietnam. In coping with the problem at that time, U.S. forces often engaged in intensive patrolling to keep the enemy beyond his four-mile effective mortar range. Applying this approach against an enemy whose rocket range may extend out to fifty miles is simply not a practical solution.

Defending key targets will become even more difficult still as guided weapon, or "G-RAMM," capabilities diffuse from great powers like China and Russia into the hands of irregular forces. This is already occurring. During the Second Lebanon War, Hezbollah fired a guided anti-ship cruise missile, launched several UAVs, and destroyed or disabled over fifty Israeli tanks with sophisticated Russian-made antitank guided missiles.

By historical standards, the U.S. military has enjoyed an unusually long near-monopoly in the use of guided, or "smart," munitions, which offer the enormous benefit of high accuracy independent of a weapon's range. The value of guided weapons became clear to all in the First Gulf War, even though they comprised less than 10 percent of the bombs dropped but were more

effective by an order of magnitude than unguided “dumb” bombs. The American military currently has no easy answer to the challenge posed by “G-RAMM’s” combination of range and accuracy, other than a massive expenditure of resources in what will likely prove a fruitless attempt to keep an enemy beyond its ever-growing capacity to strike targets at extended ranges.

A major factor enabling the U.S. military to project power abroad, and to sustain forces once they are operating in an overseas combat zone, is access to the global commons—international waters and air space, as well as space and cyberspace. Since the Soviet Union’s collapse nearly two decades ago, America’s military has enjoyed generally unfettered access to the global commons. This favorable situation is fading away.

As noted above, the rise of anti-access/area-denial capabilities, both to state and non-state entities, threatens to make key straits and coastal waters prohibitively risky areas in which to operate. Offshore oil and natural gas facilities and related infrastructure may be particularly vulnerable, as are undersea fiber optic cables. China alone seeks to create a maritime no-man’s land extending several hundred miles out to sea.

As for cyberspace, it is no exaggeration to say that information technologies (IT) permeate every aspect of America’s military operations, from training to logistics, from command and control to targeting and guidance. As the military’s dependence on IT has grown, so too has its vulnerability to disruptions, especially disruptions of its battle networks. This vulnerability also exists in America’s economic infrastructure, where everything from transportation to electric power generation and finance depends upon the proper functioning of cyber networks. Attacks on both military and civilian IT networks have been growing for at least a decade. Russia has been accused of conducting cyber war campaigns against Estonia in 2007, Georgia in 2008, and Kyrgyzstan in 2009, while China is reputed to be behind cyber attacks that disabled computer systems at the Pentagon, as well as attacks against Britain, France and Germany. Part of the problem with cyber attacks is the difficulty in identifying their source. In the murky world of computer hacking and related activities, it is unclear whether cyber warfare will enable other countries, or even disaffected groups, to inflict crippling damage on the United States military or its economy.

The situation is somewhat reminiscent of air power in the period between the world wars. At the time, air power advocates claimed that aerial bombardment of an enemy’s territory in itself would produce prompt, decisive results, while others were far more skeptical. As it turned out, air power proved critical to the success of military operations in World War II, but failed to yield the kinds of results claimed by its zealots. Today it remains unclear how devastating an all-out cyber attack on the U.S. military or America itself would be. If such strikes are able to cause substantial damage to the U.S. economic infrastructure, much of the military systems fielded to defend the American homeland, such as missile defenses, could prove to be a modern Maginot Line.

The U.S. armed forces rely heavily upon military and commercial satellites, key nodes in the military’s battle networks. The global positioning system (GPS) satellite constellation is

essential for guiding many “smart” weapons to their targets. In recent years the PLA has neutralized or destroyed satellites in low-earth orbit (where most satellites are located), by launching an anti-satellite (ASAT) ballistic missile or by firing ground-based ASAT lasers. As China’s lunar exploration program matures, the PLA will likely acquire the ability to destroy the GPS constellation, which is positioned in medium-earth orbit. Of course, the system might also be disabled by jamming it or through cyber strikes. Assuming China continues to develop and field ASAT capabilities, the U.S. satellite architecture may be a wasting asset, highly dependent upon Chinese sufferance for its effective operation; indeed, its existence.

If history is any guide, these trends cannot be reversed. Technology inevitably spreads, and no military has ever enjoyed a perpetual monopoly over any capability. To a significant extent, the U.S. military’s wasting assets are the consequence of losing its near-monopoly in guided weapons. This is true in targeting objects in space and in cyberspace, as well as ships at sea and air bases on land.

As the Truman and Eisenhower administrations were faced with the need to confront some difficult strategic choices nearly sixty years ago, so too is the Obama administration today. Will the United States accept that several areas of vital interest are becoming “no-go” zones for its military, or will it take steps to address the challenge? Will the United States accept a posture of vulnerability regarding its satellite architecture and cyber infrastructure, or are alternatives available to redress the problem? The United States can either ignore these developments, at its peril, or adapt to them. Simply put, if strategy involves identifying and creating new sources of advantage as existing ones erode, what new advantages should the U.S. military seek? Equally important, where should the U.S. military scale back its investments, and what wasting assets should it divest?

Presidents Truman and Eisenhower did not make decisions with regard to U.S. military force levels and capabilities in isolation, but within the context of an overall strategy that emphasized containing Soviet power, deterring aggression, preserving a strong American economy, and cultivating alliances with like-minded countries in general, and the great powers in particular. Similarly, the Obama administration’s choices regarding the future military posture must be informed by an overarching strategy. This is no simple matter. Given the changes underway in the geopolitical environment, rapid advances in military-related technologies, and the United States’ weakened economic standing, a major strategy review comparable to those during the first decade of the Cold War is in order.

Any strategic review must take into account three major challenges. The most immediate challenge is posed by radical Islamist groups, and finds the U.S. military engaged in campaigns in Afghanistan and Iraq, and in operations around the globe in an attempt to defeat or at least suppress them. There is also the prospect of nuclear proliferation. Should Iran become a nuclear-armed state, it could well spur a round of proliferation in the Arab world and further complicate the U.S. military’s ability to project power into the Middle East in defense of key interests.

Finally there is China, a key trading partner of the United States and potentially a strong force in support of well-established international norms of behavior. However, China's military buildup suggests that it may be susceptible to pursuing its aims through coercion, if not aggression, unless steps are taken to address its development of threatening capabilities.

Exploring options for addressing these emerging challenges will not be cheap. The United States' financial picture has eroded substantially in recent years, both in absolute and relative terms. This circumstance is not likely to be reversed anytime soon, further constraining strategic options. This suggests the United States pursue a more measured strategy, one that better balances the goals it seeks to achieve with the resources likely to be available.

In addressing instability in the developing world the United States should adopt a strategy of the indirect approach. This means using the U.S. military's advantages in highly trained (but relatively limited) manpower to leverage the developing world's large manpower base. Emphasis should be placed on training, equipping and advising indigenous forces of countries threatened by subversion, especially states confronting radical Islamist groups like al Qaeda, but also states confronting other sources of instability, such as transnational drug cartels in Latin America. Assistance should ideally be provided before states become destabilized. Where U.S. forces are deployed in large numbers, as in Afghanistan and Iraq, they should continue their efforts to field indigenous forces to enable reductions in American ground combat units. To be sure, the U.S. military will need to maintain a capacity to "surge" forces should a state of vital interest begin to fail, but such deployments should be a last resort, and not the first option. To support this approach, the Pentagon will need to determine the kinds of equipment it will use to outfit the indigenous forces of partner states, and procure the equipment in quantities sufficient to establish reserve stocks that can be quickly deployed when needed.

How will our military cope with irregular forces armed with G-RAMM capabilities? Success will require intercepting relatively inexpensive projectiles reliably and at an acceptable cost. Several alternatives are worth exploring, either separately or in combination. One involves deploying loitering "hunter-killer" reconnaissance and strike aircraft to search for enemy G-RAMM forces and, once they are identified, engaging them quickly before the enemy can fire or disperse. Another option is to harden targets against such attacks. This is an expensive proposition and is probably feasible only for the highest priority targets. Then there are active defenses that involve intercepting G-RAMM projectiles. Cost is a major problem here as well, as kinetic-kill interceptors tend to cost far more than G-RAMM projectiles. Another possibility may be found in the rapid advances in solid-state lasers, which have a cost-per-shot that is far less than traditional interceptors. Any solution to the problem, if there is one, will most likely be found in a combination of existing and emerging capabilities, and in new ways of employing them.

When it comes to power projection, the United States should adopt an offsetting strategy making it clear to Beijing that it intends to continue reassuring allies and friends in the region that they will not become victims of coercion or aggression. The growing PLA threat to U.S. forward air bases might be handled in several possible ways. One is to harden these bases against attack by missiles with conventional warheads. Another might involve deploying missile defenses to protect these bases. Still another might be to forego such bases in favor of developing

long-range strike systems. Of course, some combination of these options might provide the best solution. To offset its growing vulnerability the Navy might reduce its emphasis on large surface ships to conduct strike operations in favor of submarines armed with conventional cruise missiles. Or carriers might reduce their reliance on short-range manned aircraft in favor of much longer-range unmanned aircraft, some of which (e.g., N-UCAS) are now in development.

In terms of preserving U.S. access to space, it may be possible to shift away from relying on relatively few large “mainframe” satellites and toward micro- and nano-satellites that can be configured in less vulnerable networks. If part of the network is destroyed, it might be replaced through the rapid re-launch of backup satellites, or by activating dormant satellites previously positioned in space. Alternatively, it may be possible to use terrestrial-based clusters of unmanned aerial vehicles to substitute, at least on a limited basis, for damaged or destroyed satellites. If a challenge emerges to the U.S. stewardship of the world’s oceans, it is likely to come in the form of enemy submarines, which are far more difficult to detect than surface warships. Priority must be given to preserving and expanding upon the Navy’s advantage in antisubmarine warfare, while also developing more capable countermine capabilities. Current Pentagon plans to increase submarine production must be sustained, while design work on unmanned underwater vehicles and a new class of submarines is initiated.

Alas, as for the cyber warfare competition, it is so shrouded in secrecy that it is difficult to determine the United States’ level of vulnerability, let alone options for addressing it. It may be that a defensive strategy cannot be successfully pursued, and that the U.S. military will be forced to rely on deterring the worst sorts of cyber attacks. But given the paucity of information on this area of the military competition, we are left to speculate.

Determining whether these approaches and capabilities can offset the U.S. military’s wasting assets will take time and resources, both of which are in short supply. Significant resources may be liberated by reducing emphasis on capabilities whose value stands to be greatly diminished by the shift in the military competition. The Air Force, Navy and Marine Corps plan to purchase several thousand short-range F-35 strike aircraft that must operate from forward land bases or off of large surface ships, both of which are increasingly vulnerable. Indeed, the F-35 seems overdesigned for the emerging low-end threat while lacking the range it will likely need against a high-end threat. The Navy’s new Zumwalt-class destroyers are the kind of large surface ships that are likely too expensive to address the challenges posed by irregular warfare and too vulnerable to operate in East Asia or the Persian Gulf. Plans to terminate their production should go forward. The Marines are looking to field an Expeditionary Fighting Vehicle (EFV) that swims ashore and then fights as a land combat vehicle. Yet the fleet is being forced to operate ever further from the shore, far beyond the distance for which the EFV was designed. The EFV is also highly vulnerable to the improvised explosive devices (IEDs) that are now proliferating throughout the developing world. The Army anticipates spending over \$150 billion on its constellation of Future Combat Systems (FCS). Yet the FCS is optimized for traditional conventional warfare rather than the era of persistent irregular warfare the Army now confronts. Satellites like TSAT that are highly effective so long as space is a sanctuary must be reconsidered in recognition of the fact that this condition no longer obtains.

Operational Concepts

While it is possible to identify with reasonable clarity what military capabilities are unlikely to prove effective in addressing existing and emerging challenges to U.S. security, identifying the capabilities mix that would best preserve the nation's interests is a more challenging proposition. Ideally, the answer would be found in the development and testing of new concepts of operation—how the armed forces would combine their capabilities to deter or, if necessary, defeat a threat to the national security. Some progress has been made in this regard. For example, in the wake of confronting enemies waging modern irregular warfare in Afghanistan and Iraq, the military Services have developed new ways of operating (i.e. doctrine) and adapted existing equipment while emphasizing new systems and capabilities (e.g. UAVs, MRAPs).

This is all to the good. However, most of this was accomplished after the fact. The U.S. military found itself reacting to a threat, rather than anticipating it. Such an approach is wasteful in lives and resources, and increases the risk to the nation's security. The Defense Department needs to become better at *anticipating* emerging challenges and identifying wasting assets. For example, during the Cold War the Army and Air Force collaborated on the AirLand Battle concept for deterring Soviet aggression against NATO. A healthy debate ensued over the alliance's "layer cake" defense, resulting in the U.S. Army's III Corps being shifted to the Northern Army Group. The need for forward-positioned equipment—"POMCUS"—was identified. The need to reinforce forward-deployed U.S. forces—"ten divisions in ten days"—was identified and exercised (i.e. "REFORGER"). The maritime forces joined the process. The Navy explored options for conducting an "outer air battle" against Soviet strike aircraft threatening the Atlantic supply lines, while the Marine Corps assessed how it might help anchor the alliance's northern flank in Norway. These efforts proved crucial in enabling our senior civilian and military leaders to make informed choices regarding military systems and capabilities mix. Unfortunately, the U.S. military has yet to develop an "AirSea Battle" concept to offset China's actions and reassure allies and friends in East Asia.

The Budget

Of course, all this presumes that funding will be made available to sustain the revised defense program, and that the capabilities needed can be produced in a timely and efficient manner by the industrial base. While the FY2010 defense budget represents a modest increase over the previous year's budget, a portion of this increase is the result of shifting programs and activities previously funded through supplemental appropriations into the base budget. In addition, the administration's future years defense program (FYDP) has not yet been announced. Absent this data it is difficult to state with any degree of confidence how affordable the changes announced by Secretary Gates will be. However, given the relatively weak state of the economy, the administration's projections regarding Federal budget deficits in the coming decade, and independent assessments that reveal a significant shortfall between the defense program and the previous administration's funding estimates, it seems likely that more difficult choices lie ahead.

The Industrial Base

With respect to the industrial base, there is a strong case to be made for reforming the Defense acquisition system, and I applaud the efforts of Senator Levin and Senator McCain to approach this in a bi-partisan manner. However, I am also concerned by the Defense Department's general absence of attention to the industrial base with respect to its value as an important strategic asset of the United States. Properly incentivized and structured, there are at least two important sources of competitive advantage the defense industrial base can provide for the nation: the ability to compete based on time, and complexity and diversity.

Time-Based Competition

Time, while always an important consideration, is especially precious during periods of great change. Assuming the Department has the resources to affect major shifts in its investment posture, it must still incur a cost in the form of the time it takes to realize the benefits of these investments. Periods characterized by uncertainty and the potential for discontinuous change in military competitions may present those militaries who do not lead the change with insufficient time to adapt.

The longer it takes to produce new capabilities, the higher the risk to be addressed, since there is a lag between the time a discontinuity is diagnosed, the Department's investment strategy altered, and new military capabilities fielded. If, for example, the Defense Department could realize instantaneously the results of a major shift in its investment strategy, it would incur no risk other than that associated with sunk costs—i.e., those capabilities invested in prior to the appearance of a discontinuity, whose value may not hold up well following its occurrence. The longer a military requires to field new capabilities—be they in the form of new systems, doctrine, individual skill sets, or the creation of new infrastructure (e.g., bases)—the greater the risk that it will not be able to respond quickly enough to the new threats emerging from a discontinuity. In brief, the greater the risk, the greater the need to hedge against that risk. *The inability to compete based on time thus imposes a cost penalty.* The cost here can be thought of in terms of an insurance policy, where the Department invests in a range of capabilities to insure that it is at least minimally competitive if and when a discontinuity occurs. In doing so, however, the Department pays a price—by preparing for a range of futures, it is less prepared for any particular future.

This leads to the key observation that *if the time required to translate resources to capabilities can be compressed, it is possible to apply resources more efficiently.* This is because when hedging against a given level of risk, the ability to operate along short time lines means fewer resources need to be expended. It was not all that long ago that our defense acquisition system and industrial base were very adept at time-based competition. For example, our first Polaris Submarine, the *USS George Washington*, launched the first Polaris missile in 1960, with construction beginning only three years earlier in which an attack submarine was modified to incorporate a missile compartment during construction. Design on the missile itself began in 1956, only four years before it was first launched. Around that time, in the late 1950s, work began on what became the SR-71, whose first flight was in 1964. And the Saturn V rocket that carried our astronauts to the moon began development in 1962, and entered use in 1967.

The ability to compete based on time can also be used as a weapon. If DoD's defense planners can wait longer before committing resources, it complicates adversaries' investment strategies, since they have less information regarding the ultimate investment path the Department might take. It is somewhat similar to a game of poker, in which the adversary must begin to reveal his hand, card by card, while we continue to conceal ours. We have a much better sense of the risks and opportunities we face relative to the opponent, and (assuming we can exchange unexposed cards through a request to the dealer) a much greater opportunity to shift our competitive posture. The difference, of course, is that *the Department can decide what cards it will be dealt*, since it can choose where to invest.

Given the importance of this aspect of investment strategy—especially during periods of anticipated discontinuity in the military competition—high priority should be accorded to improving dramatically the Department's capability in this area. This implies a commitment to reforming the acquisition system. Unless the Department can make some major improvements in its defense acquisition process, the Department's ability to exploit time-based competition will be far below its potential.

Complexity and Diversity

Investment strategists exploring opportunities to impose costs on adversaries might also achieve their aims by inducing risk and uncertainty into an adversary's calculations. This can be accomplished by pursuing an investment strategy that exploits complexity and diversity. This strategy is particularly attractive during periods of discontinuity (or anticipated discontinuity) in the military competition, where uncertainty is already high. The problem posed to the adversary here, again, is not directly linked to its investment calculations concerning perceived costs and benefits. The adversary experiences no direct impact on its cost to field a given set of military capabilities. Rather, the imposed costs are indirect.

How is an investment strategy of complexity and diversity pursued? First, it helps to have certain enduring advantages. A competitor like the United States has an enduring advantage in both the scale of its defense effort and the technological sophistication of its defense industrial base. The United States has no rival (or combinations of rivals) that can muster even half the U.S. gross domestic product (GDP). Moreover, the United States can also count most of the world's greatest economic powers (e.g., France, Germany, Great Britain, Japan) among its allies. America's defense industrial base is unsurpassed in its ability to combine technologies in complex combinations through its unparalleled expertise in systems integration and architecture integration (i.e., the building of networks).

These advantages enable the United States, should it choose, to develop (and, in select cases, field) a relatively wide range of capabilities that can be combined in complex systems. This confronts an adversary with a wide array of existing and potential military "tools" that may be used against it in a military competition.

For example, during the 1930s the US Navy was developing a relatively diverse set of means for destroying an enemy battle fleet. In the years immediately prior to its entry into World War II, improvements were being made in the Navy's battleships (e.g., new ships, larger caliber guns, radar-directed fires); submarines (torpedo attack); and, perhaps most importantly, strike

aviation (dive bombing and torpedo attack). Any rival contemplating competing with the US fleet would have to stretch its resources to account for this diversity in striking power, and the variety of combinations in which it might be employed. For instance, developing defenses against torpedo bombers but not dive bombers or submarines would cause a US rival to incur high risk. Moreover, until the early 1940s the US fleet was comparatively small relative to the size it would quickly achieve during the war. Would-be adversaries could still not be certain as to how the United States would choose to scale up the size of its fleet if war came, or the mix of capabilities it would emphasize, as it had created a substantial number of options for itself.

In short, by introducing risk and uncertainty through an investment strategy of complexity and diversity, the United States posed a problem for Japan, a greatly inferior industrial power, of whether to stretch its resources rather than concentrate them. With the considerable advantage it enjoyed in scale, the United States was able to both choose the preferred forms of competition when the war began (i.e., submarine warfare and fast carrier task force operations vice battleships operating in a battle line), and to combine these forces in the most effective manner, and on a scale that the enemy could not match.

In summary, as the Congress and the Defense Department work to reform the defense acquisition system, it will be important not only to improve the system's overall efficiency, but to accord equal priority to ensuring the defense industrial base's potential to serve as a strategic asset is both enhanced and consciously exploited.

Conclusion

Secretary Gates' recent decisions regarding the FY2010 defense program mark what hopefully is the start of a much-needed debate on the state of the nation's defense posture. Given emerging changes in the threat environment, the United States has a number of major strategic decisions to make. The nation's senior leaders need to know if there is an acceptable alternative to America's growing vulnerability in key areas of the military competition. If no practical alternative exists, then U.S. national security strategy must be adjusted accordingly, and the sooner the better. However, just as it took over half a decade of effort to address the problem of America's loss of its nuclear monopoly, a strategy that addresses the United States' current wasting assets will not be crafted overnight. A sense of urgency similar to that which animated senior national security decision-makers at the Cold War's beginning is needed. This will require the persistent attention of the president and his senior national security advisors, as well as the secretary of defense and Congressional leaders. To be sure, the nation confronts a severe financial crisis, which the president cannot ignore. However, President Obama may take some solace from President Franklin Roosevelt, who simultaneously tackled both the Great Depression and the need to prepare the nation's military for what became a global conflict.

A decade ago the debate in defense circles centered on whether or not the U.S. military needed to undertake a "transformation"—to field a substantially different kind of military to address the challenges of a new era populated by new rivals and rapidly diffusing technologies. The idea faced stiff resistance from many in the military, who argued that the evidence for undertaking major changes in what was by far the world's most capable military was lacking. It

calls to mind the wishful thinking of many senior officials in the Truman administration who discounted warnings regarding Soviet progress toward an atomic bomb.

Confronted with modern insurgency warfare in the wake of the invasions of Afghanistan in 2002 and Iraq in 2003, the United States has found itself engaging in “reactive” transformation, as have the Israeli Defense Forces following the Second Lebanon War. Despite the growing evidence that a wide array of U.S. military capabilities may depreciate rapidly in value, some policy makers remain reluctant to accept the need to engage in the hard thinking that would characterize “anticipatory” transformation: preparing for emerging challenges by identifying new capabilities and methods of operating to offset or replace those whose value is depreciating. Ignoring the growing challenges to the United States’ ability to project and sustain military capability overseas in defense of the nation’s interests does not mean these challenges do not exist. Sooner or later they, and their implications for America’s security, must be confronted. A decline in the U.S. military’s ability to defend key national interests may be inevitable; however, it should not be the result of indifference or lack of attention. There are important strategic choices to be made—either in offsetting efforts to undermine America’s military shield, or accepting it and adapting accordingly. In a time of increasingly scarce resources and growing competing national priorities, the sooner such choices can be made, the better.