



Background

Executive Summary

No. 1422

March 28, 2001

GUIDELINES FOR MODERNIZING AMERICA'S ARMED FORCES

JACK SPENCER

President George W. Bush correctly points out that years of neglect and overuse have put tremendous strain on America's military equipment. Since the last comprehensive modernization of the forces nearly 20 years ago, a host of new threats to U.S. security has emerged. Additionally, the U.S. armed forces—cut by around one-third over the past decade—have been deployed more frequently than they were during the Cold War. Because of these pressures, the U.S. military must now deal with increasingly aging and obsolete equipment. The Bush Administration faces difficult choices in establishing its budget priorities for modernizing the armed forces to meet both near-term and future threats.

The debate over the modernization of the military forces is often framed around three approaches: modernizing the current generation of weapons; investing in next-generation technologies; or developing totally new and revolutionary technologies—the so-called generation-after-next weapons. However, framing the issue as one of needing to choose from among three distinct options oversimplifies a complex problem and misleads the public. Modernization will require program decisions from each of these options, based on their advantages and disadvantages.

To modernize the armed forces, the Bush Administration must first decide what it wants the U.S. armed forces to do and then build a force capable of carrying out that mission. The lack of such a cohesive defense strategy since the end of the Cold War is a key reason the forces are in decline today. Given the scarcity of resources with which to undertake urgent modernization, the Administration should clearly define its objectives for modernization. These strategic objectives should be to defend the American homeland from emerging threats, deter near-term aggression in regions of vital national interest, and maintain long-term conventional military supremacy.

Produced by the
Kathryn and Shelby
Cullom Davis Institute
for International Studies

Published by
The Heritage Foundation
214 Massachusetts Ave., N.E.
Washington, D.C.
20002-4999
(202) 546-4400
<http://www.heritage.org>



This paper, in its entirety, can be
found at: [www.heritage.org/library/
backgrounder/bg1422.html](http://www.heritage.org/library/backgrounder/bg1422.html)

Given these objectives and the limited resources with which to achieve them, the White House and top officials at the U.S. Department of Defense must apply principled guidelines to create a 21st century military force that can protect America's

future interests with minimal risk to today's national security.

Guideline #1: Long-term investments must not be made at the expense of near-term requirements.

A prudent modernization strategy requires a deft understanding of current and future threats to U.S. interests and America's current ability to counter them. Identifying future threats is important, but ignoring today's threats can prove deadly. Thus, priorities for modernizing the forces must be balanced. Making long-term investments should not be given a higher priority than addressing near-term requirements.

Guideline #2: Modernization efforts must focus on warfighting. Every Defense program should enhance the ability of the U.S. military to fight and win wars. Yet over the past decade, the men and women in uniform have been sent increasingly on so-called operations other than war. This use of combat soldiers in non-combat missions creates an incentive to modernize the military with weapons and capabilities that facilitate peacekeeping and humanitarian intervention rather than combat effectiveness. Making the U.S. military forces better suited for humanitarian intervention at the expense of warfighting, however, could invite aggression. Given the current fiscal constraints on the Department of Defense, the focus of modernization must be warfighting—the *raison d'être* of the U.S. armed forces.

Guideline #3: Modernization must secure a competitive advantage for the United States over its potential adversaries. Modernization must address the military's unmet needs and unmet threats and assure America's competitive advantage over potential adversaries. The failure to modernize to meet these goals over the past decade, combined with the rapid proliferation of ballistic missiles and weapons technology even to Third World states, has narrowed the technological gap between the United States and the rest of the world.

Guideline #4: Modernization must balance capabilities with efficiency. Efforts to modernize the U.S. military must also achieve efficiency and

cost-effectiveness. New technologies should produce a more efficient and lethal platform than current capabilities, but trading efficiency for capability would be a mistake.

Guideline #5: Modernization must respond to a technologically and strategically changing security environment. A new strategic environment is emerging as nations continue to develop more advanced systems and tactics that could target U.S. weaknesses, including access to space, vulnerability to ballistic and cruise missiles, reliance on information networks, and power projection force requirements. China, for example, has purchased Russian cruise missiles that are designed specifically to destroy U.S. ships deployed for power projection. Beijing also is pressing forward in developing space-based assets, cyber-warfare techniques, and long-range survivable nuclear missiles.

Conclusion. The U.S. armed forces must take full advantage of the emerging revolution in military affairs that is yielding advanced weaponry based on stealth, robotics, speed, precision, and information-sharing technology. But weapons incorporating these capabilities are not yet ready for deployment. In fact, many are still simply designs on paper. Regrettably, the existing force is neither prepared to defend U.S. territory nor to protect U.S. interests abroad from such emerging threats as missile attack. Furthermore, operations other than war continue to place strain on today's overly burdened and smaller forces.

A successful modernization strategy must adhere to the core missions of the U.S. military to protect and defend Americans at home and abroad and deter aggression. Following these principled guidelines will help the Administration determine a military modernization strategy that will prepare the United States for an uncertain future while helping to keep America and its interests secure today.

—Jack Spencer is Policy Analyst for Defense and National Security in the Kathryn and Shelby Cullom Davis Institute for International Studies at The Heritage Foundation.



Backgrounder

214 Massachusetts Avenue, N.E. Washington, D.C. 20002-4999 • (202) 546-4400 • <http://www.heritage.org>

No. 1422

March 28, 2001

GUIDELINES FOR MODERNIZING AMERICA'S ARMED FORCES

JACK SPENCER

President George W. Bush correctly points out that years of neglect and overuse have put tremendous strain on America's military equipment. Since the last comprehensive modernization of the forces nearly 20 years ago, a host of new threats to U.S. security has emerged from the proliferation of ballistic missiles and other advanced military technologies. Additionally, the U.S. armed forces—cut by around one-third in the past decade—have been deployed more frequently than they were during the Cold War. Because of these changing pressures, the U.S. military must now deal with increasingly aging and obsolete equipment. The Bush Administration faces difficult choices in establishing its budget priorities for modernizing the armed forces to meet both near-term and future threats.

Maintaining an aging force has two primary drawbacks: higher costs and declining capabilities. Old equipment costs more to maintain, is less efficient, requires more personnel to operate, often is more expensive to transport, and breaks down more often. Equipment designed decades ago for Cold War conditions simply cannot fulfill the requirements of a modern military force in an ever-changing, technologically advancing world. America's potential adversaries are determined to develop capabilities that focus on the weaknesses

of the U.S. forces, such as their reliance on electronics for transmitting battlefield information and the need for forward-basing areas. Not addressing these issues puts even the most modern carrier, like the recently christened *Ronald Reagan*, at risk.

The Administration must develop both a new military doctrine to address the changing environment and a new generation of equipment to counter the myriad threats growing

around the world. Specifically, so that America can meet its responsibilities to its allies and be able to defend its own interests, the U.S. armed forces must be prepared to:

- **Defend** the homeland,
- **Deter** near-term aggression, and
- **Maintain** long-term conventional military supremacy.

Produced by the
Kathryn and Shelby
Cullom Davis Institute
for International Studies

Published by
The Heritage Foundation
214 Massachusetts Ave., N.E.
Washington, D.C.
20002-4999
(202) 546-4400
<http://www.heritage.org>



This paper, in its entirety, can be found at: www.heritage.org/library/backgrounder/bg1422.html

The Administration faces a dilemma, however, in deciding how to address all three. It has inherited an aging force that will be ineffective against the threats that are emerging, even if the forces are upgraded with the latest technology. But creating a new military force that is capable of dominating future combat will be quite costly.

Significant investments must be made both in modernizing existing weapons platforms to hedge against today's threats and in the research, development, and acquisitions programs needed to prepare for tomorrow's wars. Since the United States does not have limitless wealth with which to fulfill all current and future requirements, the Administration must establish clear guidelines for modernizing the U.S. military so that the best fighting force in the world remains prepared and ready for the uncertain challenges of tomorrow.

THREE MODERNIZATION APPROACHES

The debate over the modernization of the military forces is often framed around three approaches: modernizing the current generation of weapons; investing in next-generation technologies or developing totally new and revolutionary technologies—the so-called generation-after-next weapons. However, framing the issue as one of needing to choose from among three distinct options oversimplifies a complex issue and misleads the public. Modernization will require program decisions from each of these options, based on their advantages and disadvantages.

Investing in **current-generation weapons** means procuring assets that are the same or marginally better than what has been in the force for the past 20 years. Military leaders often refer to this as the “legacy force.” Such a strategy is the least expensive up front and the least time-consuming to put in operation.

Instead of developing an advanced multi-role fighter, for example, the U.S. Air Force could quickly build a consignment of F-16s—the mainstay of today's Air Force that was developed during the 1970s. Or an aging weapons system could be upgraded to a new version, retaining most of the characteristics of the original system or program

but employing some new technologies to yield only marginally improved capabilities. This approach characterized the production of F-16s from the time they were introduced.

The U.S. Navy took a slightly different route to modernize its strike fleet. Given the extreme age of its carrier-based F/A-18 C/D fighter planes (developed concurrently with the F-16), the Navy chose to base the more modern fighter on the older plane. The result is the F/A-18 E/F, which entered service in 1999. This option will provide new planes but also will result in only marginal improvements over the predecessor fighter.

The disadvantages of choosing this path are many. Less advanced systems cost more to maintain over their lifetime, may lag behind the threat, and may divert money away from the acquisition of new, more capable systems. Yet this path may be the best response when quantity is more important than quality. For example, the threat of imminent war or the need to reinforce equipment during a war of attrition would require a rapid buildup of affordable forces. It is also the best choice when the objective is to maintain a moderately aged force. Purchasing new weapons to replace aging ones of the same class will ensure a well-functioning and modern force until the threat environment dictates a change.

Next-generation weapons are the evolutionary extension of existing weaponry. Unlike the decision to produce more of the same weapons or to make marginal improvements in existing platforms, investing in the next generation of weapons and applying new designs and technologies to current models will yield much more advanced capabilities.

Such new weapons systems, to a large extent, merely replace their predecessors in a strategy to fight and win wars. For example, where the F/A-18 E/F embodies the infusion of new technology into an old design, the Joint Strike Fighter represents the next generation of carrier-based tactical fighters utilizing advanced technologies in both design and production. Yet the Joint Strike Fighter is still a continuation of the carrier-based weapons system. Although it incorporates many technological advances that give it a distinct advantage over

the F/A-18 E/F, it only begins to redefine how the Navy will conduct its operations.

Investing in the next generation of weapons will enable the United States to maintain military superiority over potential adversaries that pursue similar capabilities. The proliferation of modern aircraft, such as the Russian MiG-29 and SU-27 and advanced air defenses like those being built by the Chinese in Iraq, significantly decreases the advantage enjoyed by American pilots. However, planes like the Joint Strike Fighter and the Air Force's next-generation air superiority fighter, the F-22, can continue to ensure U.S. superiority in relation to these threats by employing new capabilities, such as stealth (the ability to avoid radar and, in some cases, thermal detection); supersonic cruise (the ability to fly faster than the speed of sound without afterburners, to conserve fuel); and advanced avionics. Furthermore, by building in cost-saving measures and employing efficient production practices, these next-generation weapon systems could cost less over their lifetime.

A modernization strategy that relies too heavily on next-generation weaponry, however, also has certain disadvantages. First, next-generation weapons often require a greater initial investment in order to complete development and begin production. Therefore, it may take slightly longer to bring them into the force. Furthermore, some evolutionary capabilities may not be sufficient to meet the next threat, making further investment useless. Finally, too heavy an investment in evolutionary systems could interfere with the Pentagon's ability to allocate sufficient funds for a comprehensive military transformation, which could be required by a changing strategic environment.

Investing in next-generation weaponry is the best way to maintain America's military edge over potential adversaries in the near- to mid-term. But the proliferation of weapons technology is ensuring that other nations eventually will field weapons on a par with or exceeding U.S. capabilities. As such advances emerge, the United States will need to be prepared to field superior weaponry.

Investing in next-generation weaponry is a good option when a current capability is still required but the equipment is exceedingly old. For example, to conduct long-range bombing missions, the United States still depends on the B-52 strategic bomber that was first fielded in the 1950s. These systems should be replaced, but purchasing "new" B-52s would not be prudent given their technological limitations and the additional capabilities a new bomber could introduce into the force.

Generation-after-next weapons are likely to include unmanned combat aircraft, "space bombers," advanced cruise missiles, new submarines, low-visibility surface ships, directed energy weapons such as lasers and microwaves, and space control assets. Most of these systems would require far fewer soldiers to operate. Furthermore, these revolutionary capabilities likely would take advantage of robotics, miniaturization, and automation. Central to such a military revolution would be networks of land, air, sea, and space sensors to collect targeting data and other information that could be used to monitor the enemy's activities in real time; monitor the presence of chemical, nuclear, or biological contaminants; or develop navigation tactics.

By skipping the next generation of weapons and investing in generation-after-next systems, the United States would be better prepared to defend its interests against future threats. The Chinese, for example, are working to develop passive air-defense systems that detect the slight turbulence of commercial radio and television waves caused by aircraft flight—a capability that could prove effective against America's stealthy aircraft.¹ A revolutionary approach to meeting that threat would be to develop space bombers or hypersonic cruise missiles.

Revolutionary systems also could be developed to defend against such asymmetric challenges as chemical and biological contamination. They would be far less expensive to develop and deploy over the long term than much of today's force because they would be less manpower-intensive

1. Seth Stevenson, Devin Gordon, Bret Begun, Victoria Scanlan Stefanakos, and Michelle Memran, "China's New Radar Replacement," *Newsweek*, December 6, 1999, p. 4.

and would incorporate new, more efficient technologies. For example, the arsenal ship as currently envisioned would require only around 50 sailors, but it would carry the firepower of five *Ticonderoga*-class cruisers that together require 1,700 sailors.²

Like the other two approaches outlined above, a generation-after-next modernization strategy also carries with it certain disadvantages. Most of these systems exist only on paper or are early in their development. Developing them on a more rapid timetable would require a large up-front investment and involve a significant time lag before they could be deployed—a significant problem when America is already relying on an old and overused force. Furthermore, funding for research, development, and acquisition of these systems would be diverted away from other systems that could be brought into the current force more rapidly. And there is always the risk that the technologies may never pan out. Most important, these systems do nothing to address current and near-term threats.

Investing in generation-after-next weaponry would be prudent, however, when current systems lag far behind the threat, if asymmetric threats emerge that exceed current capabilities, and if the technologically and strategically changing environments require them.

WHAT CAN THE UNITED STATES AFFORD?

The defense budget measured as a percentage of gross domestic product (GDP) has decreased steadily every year since 1986, with the exception of 1991–1992 and 1999–2000, when it remained stagnant. When President Bill Clinton entered office, the United States was spending 4.4 percent

of GDP on defense; by 2000, that amount had dropped to around 3 percent.

The Bush Administration could reasonably afford to dedicate up to 4 percent of GDP to defense. With the exception of 1948, the United States spent over this amount on national security every year between 1941 and 1995. Well within historical norms, this level of spending would be adequate, given a focused and well-balanced modernization strategy, to maintain a force capable of protecting U.S. territory and U.S. interests today as well as to field an adequate force in the future. Though this amount may not be required, the Bush Administration should be prepared to increase the defense budget substantially.

STRATEGIC OBJECTIVES OF MODERNIZATION

In a recent speech at the Norfolk Naval Air Station, President Bush promised to “modernize some existing weapons and equipment, a task we have neglected for too long,” but added that “our goal is to move beyond marginal improvements to harness new technologies that will support a new strategy.”³ Defining this strategy is one of the keys to successful modernization.

The lack of a cohesive defense strategy since the end of the Cold War is a primary reason the U.S. forces are in decline today. Given the scarcity of resources with which to undertake urgent modernization, the Administration should define its objectives for modernization very clearly. Specifically, these strategic objectives⁴ should be to:

- **Defend** the homeland,
- **Deter** aggression and defeat near-term threats; and

2. For information on the arsenal ship, see Federation of American Scientists, “Arsenal Ship,” at http://www.fas.org/man/dod-101/sys/ship/arsenal_ship.htm (March 19, 2001). For information on the *Ticonderoga*-class cruiser, see U.S. Navy, “Navy Fact File: Cruisers,” at <http://www.chinfo.navy.mil/navpalib/factfile/ships/ship-cru.html> (March 19, 2001).
3. Remarks by President George W. Bush at Joint Forces Command Headquarters, *Federal News Service*, February 13, 2001.
4. These strategic objectives are derived from Baker Spring *et al.*, “National Defense: Restoring U.S. Military Strength,” in Stuart M. Butler and Kim R. Holmes, eds., *Issues 2000: The Candidate’s Briefing Book* (Washington, D.C.: The Heritage Foundation, 2000), pp. 505–510; Jack Spencer, “Building and Maintaining the Strength of America’s Armed Forces,” in Stuart M. Butler and Kim R. Holmes, eds., *Priorities for the President* (Washington, D.C.: The Heritage Foundation, 2001), pp. 213–228; and Eliot A. Cohen, “Defending America in the Twenty-First Century,” *Foreign Affairs*, November 2000, pp. 40–56.

- **Ensure** long-term conventional combat effectiveness.

Protecting the Homeland

The U.S. homeland faces at least three current threats: an attack by ballistic and cruise missiles, terrorism involving weapons of mass destruction, and electronic-cyber attacks against critical infrastructure.⁵ U.S. military forces are ill-prepared to respond to these attacks, and potential adversaries like China have indicated a desire to target U.S. weaknesses.⁶

The threat is anything but small. Russia, China, North Korea, Iran, and Iraq either possess or are developing intercontinental range ballistic missiles (ICBMs). In addition, other nations are capable of striking U.S. allies, U.S. bases, or U.S. assets with cruise missiles or shorter-range ballistic missiles, and U.S. territory when these missile are placed on ships. The very nature of America's open democratic society makes it vulnerable to terrorism, including attacks using weapons of mass destruction. Proliferation of technologies has allowed nations like North Korea, Libya, and Iran to develop their own chemical, biological, and nuclear weapons.⁷ These weapons can be delivered by almost any means imaginable, including airplane, car bomb, or ship.

Beyond this, the United States is increasingly vulnerable to information and electronic warfare.⁸ Nearly every sector of American society, including the armed forces, relies on the free flow of information over electronic and digital networks, and nations are developing methods that would destroy or disrupt these networks.

The Administration's modernization strategy must address such vulnerabilities. Central to this effort must be a decision on the roles that the

armed forces and federal, state, and local agencies will play in responding to attacks on the homeland. Both the U.S. military's legal authority to operate within the United States and its resources are limited. Although the armed services must counter threats to the homeland as they evolve outside U.S. borders, they must play a secondary role as that threat emerges within U.S. borders.

The Administration should establish clear guidelines and responsibilities for the use of military forces in homeland defense, and it should refrain from using its limited resources on missions and capabilities that are better handled by others. Thus, the U.S. military should be primarily responsible for defending Americans from aggression and preventing attacks on the homeland. Once an attack occurs, National Guard and Reserve units should take over military activities while other government agencies and private entities shoulder the rest of the burden.

Roles for which the armed forces should prepare include deterrence, intelligence gathering, preemptive strikes against entities posing imminent threats, missile defense, and research and development of countermeasures and systems to defend against threats against the homeland.

Deterring Near-Term Threats

There are nations in every region of the world that could threaten America's vital interests in the near term. To assure stability in those regions and protect U.S. interests requires the ability to defeat any nation or group that threatens them, which itself provides effective deterrence against large-scale aggression.

Potential near-term threats that the United States must be prepared to counter include the following:

5. Critical infrastructure includes telecommunications networks, electric power systems, oil and gas storage, avenues of transportation, banking and finance systems, water supply systems, and emergency services (medical, police, fire and rescue, continuity of government, etc.).
6. Michael Pillsbury, *China Debates the Future Security Environment* (Washington, D.C.: National Defense University, 2000), and *Chinese Views of Future Warfare* (Washington, D.C.: National Defense University, 1997).
7. U.S. Department of Defense, *Proliferation: Threat and Response*, January 2001.
8. David A. Wise, "FBI Warns Infrastructure Vulnerable to Cyber-Attacks," *The Washington Post*, March 21, 2001, p. A16.

- Domination of Eastern Europe by a hostile power;
- A conflict on the Korean peninsula exacerbated by North Korea's attempts to build nuclear bombs and ICBMs;
- Chinese aggression against Taiwan or other U.S. allies in the Asia-Pacific;
- Attempts by Iran or Iraq to dominate the Persian Gulf;
- A combination of radical Arab and Islamic forces endangering the survival of Israel;
- A conspiracy involving Iran, Iraq, and/or Syria to attack or destabilize Turkey, Saudi Arabia, or some other ally in the region; and
- A resource war in the Middle East or Near East that involves U.S. allies.

Modernizing the forces to enable the United States to deter and defeat both current and near-term threats is an imperative. The Administration should take every step to strengthen its important alliances and be ready to respond forcefully and immediately to aggression against them. This should include effective ballistic missile defense for America and its friends and allies around the world.

Ensuring Long-Term Combat Effectiveness

During the Cold War, the United States developed the carrier battlegroup to fight the Soviet Union on the high seas. It developed its high-tech tactical fighter forces to assure air superiority; long-range strategic bombers to penetrate Soviet air defenses; and heavily armored, large, and powerful land forces to win on the battlefield. To assure the effective use of these forces, the U.S. military forces must have access to an extensive network of forward-deployed bases and pre-positioned weaponry.

Regrettably, however, such positions are becoming increasingly scarce, and potential U.S. adversaries are developing asymmetric tactics to target weaknesses in America's capabilities and operational concepts. For example, U.S. military

strength is projected by air and sea (and increasingly by space). It is reasonable to assume that potential adversaries would focus on methods that disrupt these capabilities, such as advanced air defenses, anti-satellite capabilities, and anti-ship cruise missiles.

U.S. armed forces rely increasingly on the ability to collect, disseminate, and exchange vast amounts of accurate data. This reliance creates the incentive for potential adversaries to disrupt or destroy the networks upon which that capability depends. Such information and cyber warfare could even include detonating a nuclear warhead above the atmosphere, creating an electromagnetic pulse that would severely debilitate all electronic devices within the "line of sight" of the blast.⁹

Such diverse geographic and technological threats, largely undefined today, make it imperative that the Pentagon develop new ways to fight and win wars tomorrow. Its modernization strategy must envision battles in which America will no longer have unhindered access to forward-basing areas and where the enemy is well-supplied with technologically advanced weaponry, including ballistic and cruise missiles, and advanced imaging and tracking capabilities. The Administration must invest in technologies that provide new strategic options for rapid execution as each new threat develops. Military planners must be vigilant and forward thinking, applying each new advanced technology to weapons systems, force structures, and combat doctrines.

GUIDELINES FOR MODERNIZING THE ARMED FORCES

To modernize the armed forces, the Bush Administration must first decide what it wants the U.S. armed forces to do and build a force capable of carrying out that mission. It must decide which programs and capabilities to pursue, develop, or cut in order to achieve the strategic objectives listed above. Given these objectives and the limited resources with which to achieve them, the White House and top officials at the U.S. Depart-

9. For more on electromagnetic pulses and U.S. vulnerability, see Jack Spencer, "America's Vulnerability to a Different Nuclear Threat: An Electromagnetic Pulse," Heritage Foundation *Backgrounder* No. 1372, May 26, 2000.

ment of Defense must apply principled guidelines to create a 21st century force that can protect America's future interests with minimal risk to today's national security.

Guideline #1: Long-term investments must not be made at the expense of near-term requirements.

A prudent modernization strategy requires a deft understanding of current and future threats to U.S. interests and America's current ability to counter them. Identifying future threats is important, but ignoring current threats can be deadly. Thus, priorities for modernizing the forces must be balanced. Making long-term investments should not be given a higher priority than addressing near-term requirements.

America, as the sole remaining superpower, has many adversaries. The U.S. military must be ready to deter aggression in every region of the world and prepared to defend its interests at any moment. The surest way to prevent aggression is to maintain overwhelming military superiority, which undermines the incentive for other nations to act against U.S. interests. The surest way to protect the national interest is to be fully capable of defeating aggression should such deterrence fail.

The age of America's military forces combined with advances in the capabilities of its potential adversaries creates an urgent demand for new equipment to defend against current and near-term threats. For example, the U.S. Marine Corps still relies on Vietnam-era technology for its helicopter-based air transport fleet. The evolutionary extension of these helicopters is the controversial V-22 "Osprey" tilt-rotor aircraft. Crashes and accusations of corruption have plagued the program in recent years.¹⁰ Skipping over production of the V-22 to invest resources in the development of a revolutionary lift capability may appeal to some planners, but the risks associated with such a decision are extremely high. The Marine Corps' current airlift fleet is wholly inadequate due to its age and technological limitations. The Marine Corps desperately needs agile, longer-range airlift. If its design problems can be solved, the V-22 could satisfy this need.

Preparing for emerging threats without being prepared for current threats makes little sense, and long-term investments should never be made at the expense of near-term requirements. However, this does not argue against the desperate need for a robust research and development program.

Research and development must forge ahead, if at a slower pace, and the technologies yielded should be brought into the force as combat requirements change.

Guideline #2: Modernization efforts must focus on warfighting. Every Defense program should enhance the ability of the U.S. military to fight and win wars. Yet over the past decade, the men and women in uniform have been sent increasingly on so-called operations other than war. This use of combat soldiers in non-combat missions creates an incentive to modernize the military with weapons and capabilities that facilitate peacekeeping and humanitarian intervention rather than combat effectiveness. Making the U.S. military forces better suited for humanitarian intervention at the expense of warfighting, however, could invite aggression. Given the current fiscal constraints on the Department of Defense, the focus of modernization must be warfighting—the *raison d'être* of the U.S. armed forces.

The military equipment used to defeat Iraq in the 1991 Persian Gulf war, however, is the same that has been used since then to conduct operations other than war. The deficiencies of America's warfighting forces in those non-combat missions are helping to define the requirements for the Army's current modernization efforts. Thus, modernization is reflecting America's past commitment to non-combat operations. Continuing along these lines would be folly because deterring aggression against America's interests requires a strong combat capability, not the ability to conduct non-combat operations.

Guideline #3: Modernization must secure a competitive advantage for the United States over its potential adversaries. Modernization must address the military's unmet needs and unmet threats and assure America's competitive advantage

10. Dave Moniz, "Scandal Could Throw Osprey Off Course," *USA Today*, January 25, 2001, p. A8.

over its potential adversaries. The failure to modernize to meet these goals over the past decade, combined with the rapid proliferation of ballistic missiles and weapons technology even to Third World states, has narrowed the technological gap. For example, the superiority of the U.S. submarine fleet is threatened by the proliferation of submarines and anti-submarine technology, and America's space-based assets and computer-based infrastructure are not effectively protected against attack.

Some programs to address such vulnerabilities already lag behind the threat, and others could be obsolete shortly after they are introduced. The U.S. Navy's ship-based theater missile defense program, for instance, is testing missile interceptors against target missiles that are *slower* than the existing threat, as North Korea's test launch of the Taepo Dong-1 ballistic missile in August 1998 demonstrated.¹¹

Sometimes an evolutionary approach to modernization is enough to extend America's competitive advantage. The almost-completed *Virginia*-class attack submarine is an evolutionary system that can counter near-term threats, and the added capabilities it brings to the battlefield ensure that it will continue to be a superior submarine over its lifetime.

Some circumstances, however, require a revolutionary approach. The extended range cruise missile as currently envisioned neither offers the United States a lasting competitive advantage nor addresses an unmet threat. The new cruise missile—the follow-on to the conventional air-launched cruise missile now in use—will have many of the same limitations as its predecessor. Both systems are subsonic, and neither is stealthy. Instead of investing limited dollars in a system that likely will be vulnerable to air defenses in the near future, it would be prudent for the Pentagon to skip that generation of cruise missile and develop

a more technologically advanced system to gain greater utility over a longer period.

Guideline #4: Modernization must balance capabilities with efficiency. Efforts to modernize the U.S. military must also achieve efficiency and cost-effectiveness. New technologies should produce a more efficient and lethal platform than current capabilities, but trading efficiency for capability would be a mistake.

For example, the U.S. Army is attempting to become lighter and more mobile. Although the objective is desirable, it is technologically not yet feasible for the Army to maintain its lethality while increasing its mobility. The Army is diverting resources to procure an interim armored vehicle (IAV) that is lighter and more mobile, even though it is less lethal and less durable than today's armored vehicles. To achieve the efficiency associated with greater mobility, the Army is forfeiting lethality and durability.

Today's armored units are slow and heavy, making them vulnerable to advanced anti-armor weaponry. But if the traditional armored vehicles are vulnerable, any evolutionary vehicle would likely be vulnerable as well. Instead of investing in evolutionary armored land combat systems that may add some efficiency but not effectiveness, it would be better to maintain the current technology for the near term and at the same time invest in developing revolutionary land-combat systems that are mobile, durable, and lethal to address future threats.¹²

Guideline #5: Modernization must respond to a technologically and strategically changing security environment. A new strategic environment is emerging as nations continue to develop more advanced systems and tactics that could target U.S. weaknesses, including access to space, vulnerability to ballistic and cruise missiles, reliance on information networks, and power projection force requirements. China, for example, has purchased

11. Associated Press, "N. Korea Missile Hits Sea," *AP Online*, August 31, 1998.

12. These "revolutionary" land combat systems would likely be information intensive—gathering immense amounts of targeting and maneuver data through an array of land-, air-, and space-based sensors. Much of the force would be focused around small, highly mobile units. Armored vehicles would have a lesser but still necessary role. Such systems in the future will be lighter and more lethal. Their development should be accelerated.

Russian cruise missiles that are designed specifically to destroy U.S. ships deployed for power projection. Beijing also is pressing forward in developing space-based assets, cyber-warfare techniques, and long-range survivable nuclear missiles.

The fact that the United States currently has no defense against ballistic missiles serves as an incentive for its adversaries to obtain or develop missiles.¹³ Moreover, America's military limitations force it to rely on alliances and basing areas from which it could launch defensive or offensive operations. Therefore, its adversaries have reason to try to deny the U.S. military access to those basing areas. These threats are revolutionary in nature and will require revolutionary responses. The ability to counter them would enable the United States to control the battlefield and fight wars on its own terms. An inability to adjust to such asymmetric challenges would be crippling.

MODERNIZATION CATEGORIES

The five general categories of major weapons systems that the Defense Department must modernize are:

- Tactical fighters,
- Armored combat vehicles,
- Long-range bombers,
- Submarines, and
- Aircraft carriers.

A modernization approach for these systems that is based on the foregoing guidelines would minimize the threat to U.S. interests and ensure that America's armed forces are well-prepared to defend those interests in the future.

Tactical Fighters

The poor condition and age of America's fighter force, the proliferation of modern tactical aircraft, and the development of modern air defenses that

can counter U.S. capabilities undermine U.S. tactical air superiority. The United States should focus on modernizing this capability in the near term. To do so, however, it must realize that it may one day face adversaries who have acquired better air defenses to detect America's stealth planes, anti-ship cruise missiles to target its aircraft carriers, and innovative systems to deny access to the forward-basing areas from which the United States could launch its tactical aircraft. Such developments would seriously undermine America's reliance on tactical fighters. The Bush Administration will need to decide how much to invest in modernizing the tactical air fleet and how much to dedicate to developing revolutionary capabilities that would not have the same limitations.

The guiding principle in this decision-making process should be: *Modernization must not sacrifice near-term capabilities for long-term needs.* Modernizing the tactical fighter force will involve near- and long-term funding requirements. Funding should focus first on meeting near-term requirements, but ignoring the tactical fleet's longer-term needs at the same time could put U.S. military forces at great risk. Rather than spending \$300 million over the next 30 years on 4,000 tactical aircraft¹⁴ as planned, the Pentagon should diversify its air-to-ground strike options. It should procure enough tactical aircraft over the next 10 years to ensure a modern force, similar in size to today's, to meet near-term threats. But it should minimize purchases of aircraft that only marginally improve current capabilities and instead invest in developing a reliable unmanned combat aerial vehicle (UCAV) that could enter the force around 2010.

Beyond that date, the U.S. Air Force and Navy should gradually reduce purchases of manned aircraft and redirect funds to procure UCAVs consistent with technological feasibility. The requirement to conduct air-to-ground strike missions by tactical aircraft also should be augmented by long-range conventional missiles.

13. Jack Spencer and Michael Scardaville, "Proliferation Continues After President's Decision to Defer Missile Defense," Heritage Foundation *Executive Memorandum* No. 699, October 12, 2000.

14. U.S. General Accounting Office, *Tactical Aircraft: Modernization Plans Will Not Reduce Average Age of Aircraft*, GAO-01-163, February 2001, p. 26.

By 2020, the U.S. force should rely not on 1970s-era tactical aircraft, but on modern manned tactical aircraft, unmanned combat vehicles, and long-range precision strike missiles.

Armored Combat Vehicles

Between 1975 and 1990, the United States annually purchased an average of 2,083 large, heavy armored combat vehicles. Between 1991 and 2000, the annual average dropped to 145.¹⁵ Consequently, the United States now depends on an aging armored force—a force designed to defeat the Soviet Union—to conduct 21st century land combat. While the Army has begun to modernize this force to meet the contingencies of the new battlefield, most of its activities over the past decade have been in operations other than war, including humanitarian interventions.

This commitment to non-combat operations is now reflected in the Army's modernization strategy, the "Army Transformation."¹⁶ The 2001 posture statement asserts that the Army must better cope with the "full spectrum of operations" beyond "conventional warfighting"—which is a response to such commitments as the "implementation of the Dayton Peace Accords," "activities in Haiti," and "support[ing] the [Kosovo] peacekeeping process."

To fulfill this mission, the Army plans to develop a new system, which it refers to as the "Future Combat System" (FCS),¹⁷ to replace its heavy armored vehicles with lighter and more mobile vehicles that are increasingly lethal and equally durable. The problem is that achieving this capability is not technologically feasible in the near term. To cope with the full spectrum of operations beyond conventional warfighting before the FCS is ready, the Army plans to purchase interim armored

vehicles that are more mobile than today's armored vehicle but less lethal, less durable, and less conducive to warfighting. While the Army is positioning itself to conduct a variety of missions, however, it is also getting farther away from assuring that it can fulfill its most important mission—to fight and win wars.

For the Bush Administration, the guiding principle is simple: *Modernization must focus on warfighting, not peacemaking or peacekeeping.* The Army should refocus its transformation strategy on warfighting. It should reevaluate its plan to purchase 2,131 IAVs (at a cost of around \$4 billion over the next six years) and reduce the buy significantly. Spending such money to facilitate a commitment to non-combat operations will do little to enhance the Army's warfighting capabilities. Instead, the Army should rededicate excess funds to accelerated development of the FCS so that it can be brought into force before the planned deployment date of between 2015 and 2025. The FCS program should be optimized for warfighting requirements. Meanwhile, the Army should increase the utility of its existing armored platforms, such as Abrams tanks, Bradley fighting vehicles, and armored personnel carriers, to extend their lifetimes.

Long-Range Bombers

One of the emerging dangers facing the United States is an enemy that uses asymmetric means to challenge America's access to forward-basing areas and hold regional combat assets at risk. Modern, long-range bombers are vital in this environment because of their ability to strike high-priority targets like air defense batteries, command-and-control infrastructure, and missile batteries without regard to asymmetric threats.

15. U.S. Congressional Budget Office, *Budgeting for Defense: Maintaining Today's Forces*, September 2000, Ch. 2, at <http://www.cbo.gov/showdoc.cfm?index=2398&sequence=0&from=1>.

16. Office of the Chief of Staff, U.S. Army, Congressional Activities Division, *United States Army Posture Statement FY01*, February 2000, p. 1.

17. The FCS is a joint Army–Defense Advanced Research Projects Agency program. This system (not necessarily a single platform) will include surveillance, reconnaissance, and targeting systems, and will combine manned and unmanned platforms. It is intended to replace the Army's current fleet of M1 tanks, M2 and M3 Bradley Fighting Vehicles, and other armored vehicles starting in 2012.

America's bomber force, however, is already too old. It consists of 76 1950s-era B-52s, 93 aging B-1s, and only 21 modern B-2s. The Air Force does not plan to purchase a new bomber until 2037,¹⁸ by which time the B-52 will be nearly 90 years old and many new threats will have materialized. The Air Force needs a bomber modernization strategy to preserve America's competitive advantage by addressing these threats.

The guiding principle in dealing with this problem should be: *Modernization must secure a competitive advantage for the United States over its current and potential adversaries.* The United States now focuses bomber modernization dollars on programs that extend the bombers' life spans. This is inadequate if the goal is to maintain America's superiority over its potential adversaries, given the bombers' limitations and the emergence of new threats. A better near-term strategy would be to develop an advanced air-launched cruise missile for use on the aging bomber force. This would increase the utility of America's highly visible and thus vulnerable bombers by allowing them to target locations from more distant, safer locations.

At the same time, the Air Force should begin phasing out the B-52 and replacing it with the B-2. By 2015, only the best-conditioned B-52s should remain in the fleet. Phasing in the B-2 as the primary long-range conventional bomber over the next 15 years would give the United States a competitive advantage over potential adversaries well into the next decade.

Additionally, the United States must begin to invest in new technologies that could be introduced into the force around 2020 as the B-1 reaches the end of its service life and potential enemies become more technologically sophisticated. Research and development should focus on two new capabilities: an unmanned intercontinental range bomber and a multi-purpose space plane for bombing missions and space control.

Submarines

The nuclear-powered "attack" submarine (the SSN) is America's premier advanced technology and a multi-mission weapons platform. Though many of America's adversaries are gaining access to modern submarine technology, advanced reconnaissance capabilities, satellites, precision munitions, and ballistic and cruise missiles, none currently has the ability to detect these submarines or defend against them.¹⁹ Furthermore, the submarine is impervious to any of the asymmetric threats described above.

Consequently, the SSN is an essential weapon with which to engage enemy submarines and surface ships in war, deliver cruise missiles with pinpoint accuracy, collect essential intelligence in strategic regions, and show the flag in ports around the world. Its effectiveness in diverse situations and its long-term durability are what make it one of the most efficient weapons systems in the U.S. arsenal.

The submarine fleet, however, is aging and in danger of shrinking because not enough submarines are being bought to replace those leaving the fleet. The efficiency and effectiveness of the submarine makes its modernization both strategically imperative and fiscally responsible.

The guiding principle for the Administration in this case is: *Modernization should balance efficiency with capability.* The SSN maximizes both efficiency and capability, but since 1990, the number of SSN attack submarines in the arsenal has fallen from 96 to 56. The Bush Administration should reverse this trend as a top priority of modernization. The first step should be to refuel the seven *Los Angeles*-class SSN submarines scheduled for decommissioning before the end of their useful lives. This would alleviate short-term pressure on the current fleet. At a cost of \$200 million per submarine, such refueling would add on average 12 additional years of service life to each sub.

18. For details, see U.S. Department of the Air Force, *U.S. Air Force White Paper on Long Range Bombers*, March 1, 1999, p. 21.

19. For a full analysis of the submarine force structure, see Jack Spencer, "Why Cutting the Submarine Fleet Will Seriously Threaten National Security," Heritage Foundation *Backgrounder* No. 1374, June 1, 2000.

Next, the Administration should provide funding to increase production of the new *Virginia*-class submarines. A substantial increase in procurement is necessary because submarines that were built during the late 1970s and 1980s will retire at the same rate at which they were put into service. Thus, the Navy should plan to build two submarines per year until 2005, and then increase production to three to four submarines per year until 2019. This accelerated production schedule would avert a dramatic decline in fleet numbers in the 2020s.

Finally, the Administration should provide funding to convert the four *Ohio*-class ballistic missile submarines now scheduled for early decommissioning to conventional cruise missile submarines.²⁰ Each submarine could be armed with 154 cruise missiles, advanced sensing and surveillance equipment, and special operations capabilities—a unique combination that makes the platform unparalleled in the Navy and especially useful against an enemy that employs asymmetric threats. The refueled and converted subs would last an additional 22 years and would provide the first generation of a new underwater strike platform to augment America's carrier-based forward presence around the world.

Aircraft Carriers

The United States depends on 12 aircraft carriers to maintain America's global forward presence and to maximize its deterrence, crisis response, and warfighting abilities.²¹ Additionally, these carriers serve as joint command platforms in the worldwide command-and-control network.

Potential U.S. adversaries are developing methods to degrade the effectiveness of this force. For example, they are developing and proliferating high-speed anti-ship cruise missiles and making advances in sensing capabilities that will place the

carrier battlegroup at greater risk in the future. Advances in air defenses are making the non-stealthy aircraft that project power from the ship to the shore increasingly vulnerable. Moreover, each carrier is expensive: In addition to an acquisition cost of around \$5 billion, a carrier's annual operating cost is around \$200 million, and its midlife modernization cost runs between \$2 billion and \$3 billion.

For the Administration, the guiding principle should be: *Military modernization must address the technologically and strategically changing security environment.* Although the aircraft carrier will remain a fundamental part of America's forward presence and power projection, the Navy should not rely solely on it for those missions in the future. The strategically changing security environment dictates that the Navy should develop a new, more stealthy missile-intensive platform, such as an arsenal ship or some sort of missile submarine, to augment the current fleet. A submersible or semi-submersible platform would be able to operate largely alone and thus avoid many of the threats that surface ships face. It also would be far less expensive to operate.

To diversify its power projection abilities, the Navy should introduce the four converted *Ohio*-class submarines now scheduled for decommissioning into the fleet, and then introduce the new platform as soon as possible to share power projection and forward-presence missions. These new systems would alleviate the Navy's need to maintain 12 aircraft carriers. The number of platforms, operational concepts for their use, and process of integration would be determined as development of the new platform progresses.

The Navy should continue production of the tenth *Nimitz*-class carrier.²² Carriers that are not *Nimitz*-class should be decommissioned as planned, with at least 10 carriers remaining opera-

20. In 2003–2004, the USS *Ohio*, USS *Michigan*, USS *Florida*, and USS *Georgia* are to be inactivated even though each submarine has an expected 20 years of service life left. If the Administration's strategic review of America's nuclear forces results in the decision not to decommission these submarines, converting them to cruise missile submarines would not be necessary.

21. These 12 carriers include eight *Nimitz*-class and two *Kitty Hawk*-class carriers, one *Enterprise*-class carrier, and one *John F. Kennedy*-class carrier.

tional through 2025. A fleet of up to 10 carriers should be maintained through 2032, depending on the requirements.

CONCLUSION

The U.S. armed forces must take full advantage of the emerging revolution in military affairs that is yielding advanced weaponry based on stealth, robotics, speed, precision, and information-sharing technology. But weapons based on these developments are not ready for deployment. In fact, many are still designs on paper. Regrettably, the existing force is neither prepared to defend U.S. territory nor to protect U.S. interests abroad. Furthermore, operations other than war continue to place further strain on the overly burdened and smaller forces.

The Bush Administration must demand that significant investments are made, both in modernizing today's force by procuring evolutionary

systems to handle near-term security risks and in the research, development, and acquisition of revolutionary systems that will enable America to maintain its superpower status into the future.

A successful modernization strategy will adhere to the core missions of the U.S. military: to protect and defend Americans at home and abroad; to deter aggression and defeat near-term threats; and to ensure long-term combat effectiveness. Following principled guidelines will help the Administration to determine a military modernization strategy that will prepare the United States for an uncertain future while keeping America and its interests secure today.

—*Jack Spencer is Policy Analyst for Defense and National Security in the Kathryn and Shelby Cullom Davis Institute for International Studies at The Heritage Foundation.*

22. The *Nimitz*-class is the most modern U.S. aircraft carrier. The first USS *Nimitz*, the CVN-68, was commissioned in 1975. The tenth and last, the CVN-77, is scheduled to be commissioned in 2008.