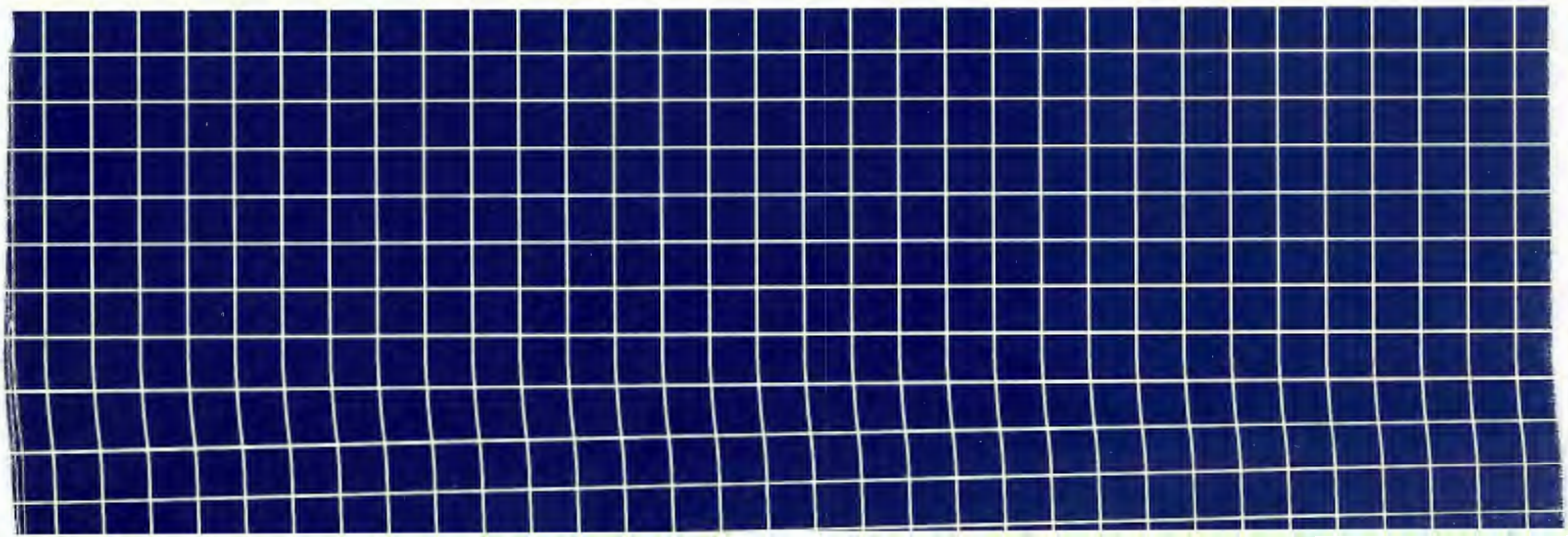
Conventional Combat Priorities:
An Approach for the New Strategic Era

The Final Report of the CSIS Conventional Combat 2002 Project

The Center for Strategic & International Studies
Washington, D.C.



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(Continued on the inside of the back cover.)

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Foreword

Let us be clear about what we have accomplished. The United States has fulfilled its historic responsibility. We have been steadfast. We have helped preserve the democracies of Western Europe during difficult times—and have helped create the new, flourishing Western Europe of today. For 40 years we have stood the watch. We have won. To say this is not to gloat but to state a historic fact. Indeed, one cannot fail to respect a Soviet Union that from a far weaker economic and political base was prepared, in the name of its own ideology, to sustain this challenge to the United States and much of the free world for so long a time. Yet, while we should be magnanimous in victory, we should not fail to celebrate this American accomplishment. Were Winston Churchill alive today, I believe he would refer to the steadfast U.S. role of these past 40 years as "our finest hour."

As a country, however, we must move on. We must recognize that the international environment has now been transformed. We must not go on doing what we have done in the past—on the premise, why change a successful strategy? Were we to do so, it would prove self-defeating. We would damage our international standing and lose the respect of our allies and the confidence of the American public. Thus, quite properly, the rationale for our conventional forces is up for review and debate.

The military balance has been radically altered. How long the Warsaw Pact may survive as a political association is an open question, but its role as a military alliance and a military threat has been largely broken. The modest reduction in Soviet military deployment has been dwarfed by the essential departure of the Soviets' Warsaw Pact partners as military allies. Under these circumstances, one cannot conceive of a Warsaw Pact offensive save as an act of supreme folly.

U.S. deployments in Europe over the years have been justified as a part of a stalwart conventional capability intended to help deter Soviet or Warsaw Pact attack. That role for U.S. conventional forces has now been superseded.

I am a longtime Atlanticist. During my tenure as secretary of defense my principal concern was the rebuilding of our NATO forces, the development of a more persuasive deterrent posture, the creation of a more stalwart conventional capability, and the resistance to pressures, such as the Mansfield amendment, for the reduction of the U.S. presence and commitment. Over the years, former colleagues have called for a downsizing of U.S. forces. Rightly or wrongly, I have always resisted. But we should plan now to scale back our forces in Europe radically. The time is now. Implementation may extend over months or years, as circumstances warrant. But the reduction must be planned now.

We should begin now to discuss the character of a residual force that is desired by our European partners. That force can be a symbol of the abiding U.S. commitment, insurance against the international environment (despite all present prospects) turning darker again, and a logistical base for the return to Europe of U.S. forces, if that should prove necessary. Such a residual force, after the scaling down of the Soviet presence, would be but a fraction of our present deployment.

In 1815 after the defeat of Napoleon and in 1848 after the revolutionary changes in Europe, imperial Russia advanced its forces to the West—just as did the Soviet Union in 1945 in the wake of the defeat of Nazi Germany. But imperial Russia ultimately withdrew her forces, and now, some 45 years after World War II, the somewhat similar advance of the Soviet Union into the heart of Europe is coming to a close. Events are now forcing the pace of change in Eastern Europe. The Soviet empire and the Soviet threat are receding. Some of our defense people like to speak of the "uncertainties." To be sure, there are uncertainties. But the outcome of these uncertainties will not lead to the reimposition of Soviet domination in Eastern Europe—nor to the restoration of the classic threat that has concerned us since the Berlin blockade. All the king's horses and all the king's men cannot put that particular humpty-dumpty together again.

Unless we in the defense community acknowledge the fact that fundamental and irreversible changes have taken place, we will come to seem irrelevant. Our role in Europe and to some extent in the world generally has been altered. Therefore, our forces should now be pointed toward their future role. We will feel obliged, I am sure, to remain a global superpower. But we should cling neither to past glories nor to past problems. The

great U.S. mission in Europe is now drawing to a close. It has been, in my judgment, America's finest hour. For 40 years we have provided a shield protecting the new and reborn democracies of Western Europe. But now we must move on to new tasks—among them, helping to develop the new architecture of European security.

In this project, "Conventional Combat 2002," the Center for Strategic and International Studies is leading the way in attempting to establish a new consensus on a national security strategy for the United States that will carry the nation into the twenty-first century. We did not begin with that purpose in mind. I recall that at our first session in May of 1989 we had no idea of the pace of change we were about to witness. Our intent was to examine new ideas for conventional forces in the face of a rather evolutionary threat. But from Tiananmen Square to Timisoara, our deliberations were caught up in a breathtaking sweep of events that caused us to broaden the scope of the project to include a fundamental assessment of the entire strategic horizon of U.S. national security. This panel report presents the results of those deliberations and, to the extent we were able to achieve a measure of consensus among ourselves, our recommendations for strategy, force structure, doctrine, and technology for U.S. conventional forces for the new era.

James R. Schlesinger
Counselor
The Center for Strategic and International Studies
May 1990

Preface

The Center for Strategic and International Studies has long maintained a priority for conducting studies and analyses on conventional forces in U.S. national security policy. In 1981, the Center completed a study of "Strategic Priorities for the Army to the Year 2000," which remains a prime example of the kinds of forward-looking, anticipatory projects the Center conducts. CSIS completed a more detailed analysis of conventional forces in its 1985 project, "Conventional Force Structures at a Crossroads." In 1987, the project on "Future Battlefields" explored a wide range of possible scenarios for future conventional conflict. And in 1988, at a time when many were concerned that U.S. forces were suddenly outclassed on the conventional battlefield, the Center held a major conference on the controversial issue of "Armor/Antiarmor Technologies."

The present project builds on that considerable record of past achievement by examining future conventional combat issues at a time when the world is changing at a dizzying pace. The project mission is to develop a bipartisan blueprint for U.S conventional force policies for 2002. The year 2002 is the important year to focus on because, given budget and acquisition cycles, decisions made today will largely bound the range of the size and capabilities of the forces available 12 years from now.

To accomplish that mission, the Center invited a number of distinguished persons—whose names are listed on the inside covers of this report—to serve on a steering committee to guide the work of the project. Under the direction of the steering committee, the project staff, taken from the Center's core professional staff, formed eight working groups to explore specific issues and aspects of U.S. conventional forces and the conflict environment of the future.

The steering committee developed four objectives for the project:

- discern trends of combat for the future;
- identify operational needs for U.S. forces;

- explore options for force structure, doctrine, and technology; and
- recommend policy changes required.

The steering committee provided initial and ongoing guidance on the strategic environment within which the working groups and the project staff were to set out independently to achieve these objectives. This report details the results of those deliberations and sets forth the steering committee's recommendations for action.

The working groups were divided into two categories. Mission area working groups explored aspects of conventional combat at specific intervals across the spectrum of conflict. Working groups on low-, medium-, and high-intensity conflict developed conclusions and recommendations for each level. Of course, the division of conventional combat into such categories is entirely artificial and imprecise; to the soldier in battle, all conflict is intense. But we found it useful to separate conventional warfare into these categories for analysis even though we were often uncomfortable when we fell into the trap of thinking that this paradigm was the basis for visualizing warfare on a personal level.

The other cluster of working groups was formed around more functional approaches to understanding conventional combat. Working groups on technology, space applications, Europe, and combat lessons learned cut across the spectrum of conflict and sought to identify needs and solutions to conventional combat questions without constraint as to level of intensity.

We also benefited from a unique and unprecedented group that provided a useful perspective on the deliberations of all the working groups. CSIS annually has in residence a number of military fellows who are active duty officers detailed by their respective services to the Center for a year of study and reflection. This year the Center had six military fellows, including, for the first time, two from the National Guard. These CSIS military fellows formed a working group of their peers in the Washington area who met periodically—in a purely personal, unofficial capacity—to review and comment on the proceedings of the other groups and to provide a practical and experienced critique of the ongoing work. Of course, their participation in the project in no way conveys endorsement of this report, either personally or officially, by the Department of Defense, the armed services, or any agency of the government.

This effort has been a bipartisan one, as are all CSIS projects. Although each of the members of the steering committee and the working groups participated in a personal role, we aimed at the outset to develop conclusions and recommendations that would enjoy bipartisan support. We have tried to maintain a balanced view of what the future holds for this country and what conventional force policies the United States should pursue to best preserve its national security.

Overview

Shortly after his great victory at the battle of Waterloo, the Duke of Wellington noted that "Next to a battle lost, the greatest misery is a battle gained." The sudden and breathtaking demise of communism in Eastern Europe represents a "battle gained" of historic proportions, perhaps even more profound than Waterloo.

The victory of democratic forces in Eastern Europe is also a fundamental victory for the United States and its strategy of containment. But the "battle gained" poses new challenges and new dangers relevant to this Conventional Combat 2002 project. The whirlwind pace of change far exceeds the ability of governments to react in a coherent and strategic manner. The work presented here is an important first step in the development of a national strategy and force structure for the year 2002 and beyond.

We are not at the "end of history"—as claimed by some—but in the middle of it. Resurgent nationalism appears poised to replace Marxism as the destabilizing ideology of the 1990s and beyond and is evident in the ethnic struggles in the Soviet Union and in Middle Eastern terrorism. Nationalism even takes an economic form in the aggressive trade, industrial, and technology practices of the industrialized world. The rise of this powerful force injects an additional element of unpredictability to the future strategic environment by increasing the possibility of conflict—whether political, economic, or military. Therefore, the scope of this project has not been limited solely to consideration of the problems of conventional conflict 12 years hence.

Nineteen ninety marks the beginning of a policy debate that will largely set our course for strategy and policy through 2002. If we fail to establish a strategic road map to guide us through the critical decisions, we will end up with a strategy by default, one which is likely to be guided more by bureaucratic and political imperatives than by a grand strategy that harmonizes resources and objectives.

Grand strategy orchestrates an array of economic, foreign policy, and military instruments into an effective national security policy. Without such a strategy, the approaching military

build down will degenerate into a shortsighted and chaotic struggle between the president, the Congress, and the armed services. A new grand strategy is necessary to ensure that the army, navy, and air force implement force reductions in a coordinated and coherent manner. An effective grand strategy will also ensure that cost-cutting will preserve the first strategic principle—economy of force. Doing more with less will be the key to sustaining a national security consensus in Congress and with our European and Pacific allies.

The dramatic pace and direction of events in the Soviet Union and Eastern Europe also dictate a corresponding adjustment in our strategic thinking. The Soviets are dismantling their eastern empire. The Kremlin appears to be losing its grip in the Transcaucasian and Baltic republics. Even if the Kremlin attempts to reverse course, the Soviet Union has opened a Pandora's box that President Gorbachev—or his successor—will be unable to shut. These trends have rendered the Soviet Union, at least for now, less of a direct military threat to the West.

The United States cannot base its strategic calculations entirely on the good health and political survival of one man, however. Should Gorbachev pass from the scene, he may take *perestroika* and "new thinking" with him. As Gorbachev himself has shown, Soviet intentions are subject to sudden and dramatic change. Our grand strategy must therefore take into account not only current Soviet intentions but also Soviet military capabilities—which will still be considerable in the year 2002, even with reductions from a Conventional Forces in Europe (CFE) agreement.

Even if Gorbachev succeeds in staying the course, the increasingly fluid situation in Eastern Europe contributes to the danger of miscalculation, of events escalating out of control. No one in Europe in July of 1914 intended to fight a world war over the assassination of the Archduke Ferdinand. Although we welcome the Soviet rollback, we must realize that the forces of instability in Eastern Europe that led to World War I are once again at work. Our military strategy, which today is designed to counter a Red Army blitzkrieg through the Fulda Gap, must in the future ensure that history does not pick up where it left off in 1914.

NATO is not obsolete but must take on the new mission of maintaining both stability and democratization in Eastern Europe. Much thought and study must go into this new dimension of European security, which will have a profound impact on our strategy in the coming century.

In terms of attitudes, however, in the United States interest in the future of NATO is waning as the threat that gave rise to the partnership appears to subside. We may even be moving into a new era of isolationism. More Americans question whether the United States should continue to bear the major responsibility for deterring major threats to world peace. This mood is likely to grow.

At the same time that Americans are becoming less interested in participating in the physical defense of Europe, Western Europe is showing signs of new dynamism. By 2002, the United States will face a more powerful and confident Europe. The European Community (EC) is taking great strides toward its goal of integrating national markets by 1992, and the Western European Union is assuming an increasingly prominent role in the coordination of military policies. The growing unity will translate into a more assertive European foreign policy. Already, the EC Commission has seized the leading role in forging a new cooperative relationship with emerging democracies in Eastern Europe.

Meanwhile, our own U.S. understanding of national power is undergoing a profound transformation. Recent opinion surveys indicate that a majority of Americans view economic competition with Japan as a greater threat to national security than Soviet military power. A similar revolution has occurred in Soviet thinking. *Perestroika* reflects Gorbachev's recognition that the faltering Soviet economy can no longer sustain the bloated Soviet military.

Yet although we are more concerned with the economic considerations of national security, we are less able to exert a direct influence over them. The global economy is increasingly integrated. Foreign exchange traders in London and Tokyo exercise more influence over the value of the dollar than the U.S. Federal Reserve. Virtually all major U.S. manufacturers are dependent on foreign-made components.

We will also witness continued dynamism in the Pacific region in the coming years. Some say China and India will emerge in the 1990s as economic giants. Japan's economic machine shows no signs of running out of gas. South Korea, Taiwan, Australia, and the countries within the Association of Southeast Asian Nations (ASEAN) will become more aggressive exporters. By 2002, the United States will face more intense competition for international markets as well as for global

leadership. If we respond to these growing challenges with protectionism, we will undermine our international security relationships and accelerate structural disarmament of the West.

The United States faces serious economic problems that jeopardize its standing as the world's preeminent power. Political gridlock has stymied meaningful progress on the trade and budget deficits. Other intractable economics problems—such as sluggish productivity growth and low savings rates—cast a shadow over the current prosperity.

As recent events in Latin America have demonstrated, the Third World remains volatile and unpredictable. Whether *perestroika* will translate into an easing of superpower rivalries in the developing world is unclear. For every Angola, there is an El Salvador. The Soviets continue a massive arms lift to their clients in Afghanistan. Moreover, the decline of superpower competition in the developing world could unleash powerful local forces that may render regional conflicts more rather than less likely. Alarmingly, the United States is quickly returning to a dangerous dependence on the volatile Persian Gulf for the bulk of its crude oil supplies.

Yet another threat to U.S. interests results from the emergence of a multipolar world. Ironically, a world of many powers is not necessarily more stable than a world dominated by two powers. In fact, 400 years of history prove just the opposite. Japan and a reunited Germany are likely to play Great Britain's role as the balancing powers. The United States must develop a grand strategy to manage the transition to a multipolar world or it is risking a return to the precarious balance of eighteenth century Europe, albeit a global balance.

For 40 years we have relied on a strategy of nuclear deterrence. We have long recognized that we could not afford to match the Soviet Union in its willingness to devote a major portion of its gross national product (GNP) to maintaining its military machine. We designed our force structure not to defeat the Soviets on the battlefield, but to raise the costs of aggression to unacceptable levels. Thus both massive retaliation and flexible response, complemented with forward defense in Europe and forward deployment elsewhere, have effectively prevented the war neither side could afford to fight.

But now those tenets of our strategic doctrine are quickly becoming irrelevant. The momentum to denuclearize Europe may undercut our flexible response doctrine. Without U.S.

nuclear forces based in Western Europe, we will return to earlier days when our allies had difficulty believing we would be willing to sacrifice Chicago for Hamburg. The threat of nuclear response, including the option of a first use in the event of war, will be virtually unbelievable by 2002. Flexible response will be a mere anachronism if Europeans prohibit the modernization of theater nuclear forces or if such forces are reduced to zero through negotiations—or if we find that our theater nuclear weapons are targeted at a democratic Eastern Europe.

In the 1970s, at the strategic level, nuclear parity itself eroded the credibility of flexible response. Both superpowers seem intent on continued research and development into strategic defenses that may, by 2002, prove feasible.

Our forward strategy is also in jeopardy, both in Europe and elsewhere. What is the meaning of forward defense when there is no line to defend in Germany? As the Germans themselves heal the division forced on them by the Cold War, the border military regime may also become anachronistic.

So it is time to apply ourselves in earnest to the business of matching our resources to our goals and commitments. Because we are uncertain of the exact nature of the threat, precisely what our strategy ought to be for the year 2002 is difficult to determine today. We need time to sort out our strategic interests and priorities for the next millennium. We have not had the experience of forming a new grand strategy since just after World War II. Our method of determining how we will match our resources to our objectives is seriously flawed. We must improve our approach before we contemplate what conventional force structures, doctrines, and technologies we need by the next century.

Unfortunately, our government is ill equipped for strategic thinking. The executive branch generally remains focused on the latest tactical crisis, despite the existence of policy planning staffs in both the Departments of Defense and State and notwithstanding the mandate of the National Security Council (NSC) to be more forward-looking. Recent administrations have become increasingly fragmented in developing national security strategy.

Now the strategy of "more" is over. The need for a strategy of better use is upon us. The way of Ulysses S. Grant—the predominant U.S. way of war—is no longer affordable, and the way of Robert E. Lee is a necessity. But that strategy can only emerge from a close review of our commitments and objectives.

We need a net assessment of our strengths and weaknesses, our maldeployments and misapplications.

But if the executive branch has been unwilling to take an integrative approach to the development of strategy, the legislative branch is incapable of doing so. The Congress has become so devoted to servicing constituent interests that fewer and fewer of its members are able to rise above the political fray and join with the president in forming a bipartisan approach to a national security strategy. The expansion of committee jurisdictions threatens to choke the strategy development process.

We need a process and an institutional arrangement to overcome these inherent difficulties in order to develop an effective national strategy for the next century. If we fail to build such a structure, the United States will shed military capabilities solely for shortsighted budgetary or political reasons.

Economic war comes from barriers and restrictions; shooting wars in this century have almost always evolved from uncertainty, division, and misperceptions. Unity and coherence must be the bedrock of our strategy. It must start with the presidency and Congress. As Justice Robert H. Jackson noted in 1952, the president achieves the strength of the sovereign when both branches act together. But the reconstruction of unity and coherence must begin with the United States of America, for if the last, best hope of the world is in the balance, world peace is too. Ultimately, the task requires leaders with both vision and determination to make the difference in a time of peril and promise. Only then can the fruits of the "battle gained" be won.

David M. Abshire
President
The Center for Strategic and International Studies

Executive Summary

The U.S. defense establishment is facing a dramatic transformation to new missions, structure, and strategy to enable it to meet future national security challenges. Current defense budget deliberations will determine the basis for the architecture of the post-Cold War U.S. military and the size and structure of the U.S. armed forces into the twenty-first century. The restructuring of the U.S. military must take place within an overarching strategy that takes into account the changing security environment, the domestic economic situation, and the leadership role of the United States in the global community.

The Conventional Combat 2002 project was established at the Center for Strategic and International Studies (CSIS) to provide a bipartisan policy framework for restructuring U.S. conventional forces. More than 100 CSIS and outside experts, in close coordination with U.S. legislators from both parties, under the leadership of project cochairs Dave McCurdy (D-Okla.) and John G. Rowland (R-Conn.) spent the past 12 months in an intensive analysis of the options facing the administration and Congress for U.S. conventional forces. A distinguished steering committee provided initial and ongoing guidance on the strategic environment within which eight separate working groups analyzed specific issues and aspects of force structure, doctrine, and technology for conventional forces into the next decade.

The result is not a wish list of costly new weapons. On the contrary, the project identifies priorities and opportunities for a strategically focused defense design for the 1990s and beyond. The project aims at what CSIS President David M. Abshire calls a "globalized competitive strategies approach" to security that will mesh enduring U.S. military, technological, diplomatic, economic, and political strengths into an integrative and mutually supporting whole—in effect a U.S. "Grand Strategy" for national security in the twenty-first century.

The project began by exploring a strategic perspective of the monumental changes shaping the global political and security environment. Not since the Middle Ages have all five

major factors in the balance of power—economic, social, religious, technological, and military—changed at one time. The United States is facing a time of great optimism, one that is simultaneously rife with the potential for instability. The end of the Cold War has left the United States the predominant military and economic superpower. How long the United States can maintain this position of primacy is uncertain, however. Ironically, in a time when the United States should be celebrating what some have called its greatest success, the country is faced with its most daunting postwar economic and security challenges. Instability in various global regions, a changed mission in Europe, and a transformation of the entire global security environment will mean a change in the roles, missions, and military commitments of U.S. conventional forces.

Conventional Combat Milieu

No other international security, political, or economic environment has changed more dramatically than has Europe's. For almost 50 years, U.S. forward deployment and commitment to maintaining peace in Europe have always included the threat of nuclear escalation. In a few short months, the European security environment has been transformed. Alliance commitments, indeed the cohesion of the North Atlantic Treaty Organization (NATO) alliance itself, will never be the same. Nevertheless, the United States must still confront the military capability of the Soviet Union, which in 2002 will continue to possess the means to destroy the United States within a matter of hours.

Combat Lessons Learned

Even as the potential for conflict between the superpowers began to diminish, fighting raged on the periphery of that relationship during the 1980s. The Third World was host to a collection of hostile actions that, in battlefield intensity, exceeded many in previous history. U.S. forces were directly involved in their largest ground combat operations since the Vietnam War, in Grenada and then in Panama, restoring power to legitimate governments in both operations. Although the Grenada operation revealed serious operational problems, the difficulties discovered and remedies applied assured success in Panama. Other world powers, notably Britain and the Soviet Union, also bloodied themselves in fights to regain what each regarded as lost territory. Britain regained national territory in the Falklands in a dramatic fashion, while the Soviet Union suffered a costly and humiliating defeat on the battlefield because of fierce Afghan resistance bolstered by U.S. aid. In other areas of conflict, particularly the Middle East, fighting raged with an intensity not unlike that seen on the battlefields of World War I as Iran and Iraq fought a long, expensive war of annihilation. Conventional combat in the 1980s was varied and complex.

None of the conflicts of the 1980s followed expected patterns. Forces in the field and at sea were forced to adopt new doctrines and develop new technologies to address the varied and often ambiguous threats they faced. The 1980s proved once again that technological initiatives are no substitute for a professional, highly trained force. In every case, the human dimension—not the technological, organizational, or doctrinal one—dominated the battlefield. Whether it was the British foot soldier slogging across South Georgia Island to eject dug-in Argentine troops or fanatical, inexperienced, poorly trained and even more poorly led Iranian militiamen stopped by the smaller but better equipped Iraqi force, or U.S. rangers, marines, airborne, and special operations forces defeating Panamanian soldiers in hand-to-hand combat, the lessons of the 1980s emphasize that a premium must be placed on readiness for war and the preparation of individuals and units for combat. As the force structure is drawn down, greater investments will have to be made in training and readiness systems and in programs to develop a professional, highly trained, and well-led core fighting force.

Mid-Intensity Conflict

Mid-intensity conflict (MIC) refers to future wars of a larger scope than low-intensity conflict, yet not global in reach. The more dangerous form of conventional combat in the future for U.S. forces will be MIC, especially in the Middle East and southwest Asia. The rise of anti-Western forces, the intensified military competition in the Third World, the rise of regional powers, and the continued proliferation of advanced weapons—as well as the Third World's ability to manufacture weapons—will ensure high levels of instability in these areas.

Mid-intensity conflict will continue to be the most difficult and costly, as well as the most dangerous, conventional combat scenario. This will be a result of the changing security environment whereby Third World states by 2002 will have medium-range ballistic missiles with accuracies—measured in circular error probable (CEP)—better than 50 meters; weapons of mass destruction; advanced air defense and electronic warfare systems; armor, artillery, and air forces of at least 1980s U.S. quality; and sea, air, and space power projection capabilities.

The United States will become more vulnerable to involvement in MIC in the Middle East or southwest Asia due to growing domestic United States dependence on foreign oil and other resources. The growing globalization of the U.S. economy in manufacturing, finance, and technology will multiply the sources of conflict and magnify the potential need for employment of conventional forces. Nothing short of a redesign of forces to fight effectively in the MIC environment and for greater deployability is required. The United States will need a new class of middleweight forces for this environment, forces with the firepower, mobility, and survivability of heavy divisions, but as rapidly deployable as light infantry divisions. To counter the ballistic missile threat, the United States will have to develop effective protection for deploying forces, including theater ballistic missile defenses and antitactical ballistic missiles. Strategic lift will be essential for this kind of conflict and, as middleweight forces are developed, the needs will have to be met by long-range strike systems such as cruise missiles, carrier-based aircraft, long-range piloted penetrating bombers, and marine amphibious forces.

Low-Intensity Conflict

Low-intensity conflict (LIC) is the most likely form of conflict the United States will face in the next century. Over the past decade alone, the United States was directly engaged in LIC actions in Lebanon, Grenada, Iran, Panama, the Persian Gulf, El Salvador, the Philippines, and Libya. Furthermore, the potential for United States involvement will escalate correspondingly as diverse forces—religion, nationalism, hunger, population growth, scarce resources—erode the ability of Third World states to govern. The United States will need to maintain a substantial—and probably an increased—low-intensity conflict capability.

All the services, including the U.S. Coast Guard, need more sophisticated LIC capabilities, such as surveillance, intelligence, detection, and global monitoring. A "Watch List" is needed for quick surges in security assistance to important Third World nations under threat. U.S. forces need enhanced psychological warfare and civil affairs capabilities. Nation-building, not war-fighting, will be the key operational concept. Better integration of defense efforts into the interagency process for developing a comprehensive national LIC strategy is essential.

High-Intensity Conflict

High-intensity conflict (HIC) represents the least likely but most dangerous conflict scenario the United States will encounter. High-intensity conflict is defined as wars of global scope that the United States cannot afford either to ignore or to lose and for which the efforts of the entire nation would be mobilized for victory. With a reduction in defense outlays, it is questionable that the military can maintain in peacetime the capability to succeed in high-intensity conflict. The requirements necessary for high-intensity war-fighting, including a robust force structure, adequate stockpiles of war-fighting material, the national will necessary for full mobilization, and the willingness to incur large-scale casualties, may not be attainable in today's context. Changing technologies and future conventional arms control regimes will undoubtedly have the greatest impact on the force structure necessary for high-intensity conflict.

Despite the improbability of such conflict occurring, the United States must maintain its capability to address the threat of HIC as long as other nations maintain the capability to threaten vital U.S. national interests. Required combat capabilities for HIC include force projection, early firepower, and sustainability. Force projection will demand carrier battle groups, long-range piloted penetrating bombers, and deployable corps-sized combined arms heavy ground-based forces. Early firepower will require long-range accurate strike systems such as sea- or air-launched cruise missiles, ground-launched tactical missiles, and aerial strike craft—piloted or unpiloted. But sustainability will be the greatest challenge the United States faces, and the greatest shortcoming for HIC today is strategic lift.

Technology

The United States has long relied on its technological superiority to make up for an inability to match all potential enemies in quantity of weapons or troops. This technological superiority has assured the U.S. position as the world's leading military power. That position is now being challenged in a number of areas. Unless a concerted effort is made now to establish clear technological priorities and to make fundamental changes in the way the United States applies technology to military needs, U.S. conventional forces will be faced with critical qualitative imbalances in conventional combat capabilities.

Additionally, the number of suppliers of advanced technology, such as China, Brazil, and Japan, as well as the traditional European providers, has dramatically expanded and will continue to challenge what is widely recognized as a declining U.S. technological dominance. The increased trade in advanced weaponry along nontraditional South-South or East-South lines will speed the pace at which the United States loses its technological superiority.

Fundamental to the successful and timely infusion of technology into weapons systems is the acquisition process. The U.S. acquisition system is beset by a combination of difficulties that impedes the exploitation of technology to solve military problems. These difficulties include a long-standing U.S.

unwillingness to accept reasonable intelligence projections of weapons development in the Soviet Union and the rate at which the USSR is modernizing, the inability of the acquisition system to move technology from laboratory bench to fielded system in a timely and efficient way, and the inability of the U.S. program and budget system to provide a competitive modernization rate in fielded systems.

A new approach is needed to identify those technologies that are truly critical. Combat needs must be explored and then science applied to develop the capabilities to perform these combat functions so that a more useful set of technology priorities can be developed. Technology can provide advanced capabilities for U.S. conventional forces for the following five most important combat needs: long-range reconnaissance, surveillance, and target acquisition (RSTA); long-range strike systems; battle management; survivability; and training.

Space: The High Ground of Conventional Combat 2002

Because of the global coverage provided by space satellites, the military applications of space-based systems have traditionally concentrated on strategic systems. In the recent past, however, a growing emphasis has been placed on drawing space assets into the operational and tactical levels of war. As resources for defense decline, the multiplicative quality of space-based capabilities must be maximized.

Space will be the next arena for conventional combat in 2002. Conventional forces fall far short of their potential to exploit space capabilities because of a lack of understanding of what is or could be available. A vital part of the solution is to continue to vest acquisition authority and responsibility into the commander in chief, U.S. Space Command (CINCSPACECOM). Moreover, conventional combat users must routinely be involved in the acquisition process for military space systems. Autonomous and remote-controlled aerial vehicles must be developed as part of a future "high-low" space mix. Improved distribution of data from space is essential for operational and tactical level users. Greater interoperability with current or planned ground systems must be designed into the space systems. Also, a satellite

defense system and an antisatellite weapon (ASAT) capability need to be developed.

The path to incorporating space systems and their products into conventional combat is impeded by four substantial obstacles. First, the laws of orbital physics will continue to limit the ground coverage and availability of space-based systems. Second, the space bureaucracy, including the numerous agencies involved in space operations, lack a sense of direction and a cooperative attitude that will be needed to support national security needs in conventional warfare. Third, budgetary pressures, as with all weapons systems, limit conventional force commanders' accessibility to space systems. Fourth, unique service needs impede the further exploitation of space for conventional combat.

Globalized Competitive Strategies: A Policy Approach

The Conventional Combat 2002 project looked 12 years ahead because decisions made today will govern force structure, doctrine, and technology available in 12 years. Rational solutions must be developed today, even though we are living in an uncertain time and the future is at best obscure. In 1978 we did not foresee the events that have transpired over the last 12 years; indeed few would have believed that Iran would seize the U.S. embassy in 1979 or that the Soviet Union would invade Afghanistan that same year. But strategic decisions were made in the late 1970s that led to the development of stealth technology, the modernization of U.S. conventional forces, AirLand Battle doctrine, the deployment of intermediate range nuclear forces, and the Strategic Defense Initiative (SDI). Other initiatives were begun in the 1970s that were consistent with a strategy the United States had laid out in advance and led to success in the U.S. confrontation with the Soviet Union that persisted during the first half of the 1980s.

Although no one can precisely anticipate what will happen in the years before 2002, the United States must develop a strategy for conventional force structure, doctrine, and technology that will be consistent with national goals and purpose. This project was established to provide a bipartisan framework for

the restructuring of U.S. conventional forces. The restructuring process must not become a mere bureaucratic or political procedure; instead it should follow a strategically focused defense design for the 1990s and beyond.

A globalized competitive strategies approach to analyzing strategic and conventional force issues can provide the needed framework for dealing with the new worldwide strategic environment. Competitive strategies—focusing U.S. strengths to develop capabilities that adversaries cannot affordably match—is the most effective means of addressing the uncertain evolution of the Soviet threat and other threats. Pursuing a competitive strategies approach, the United States can effectively develop appropriate force structure, doctrine, and technology options for conventional forces. This approach approach is the best way to integrate U.S. military, technological, diplomatic, economic, and political strengths into the mutually supporting components of a national security strategy.

I

The Conventional Combat Milieu

From the outset of the project we found it necessary to begin consideration of the problems of conventional combat by looking first at the global strategic environment. It is very difficult for us to discern today where the world is going tomorrow. Will Mr. Gorbachev succeed in leading not only his own Soviet Union, but perhaps by example the rest of the communist world, through a reform process that will make them more prosperous, peaceful and democratic? Or is reform a 10-year tactic aimed at producing a leaner, meaner Soviet Union in the twenty-first century? Either way, is the reform process going to be successful or will it fail in the face of revolution from the masses demanding a more complete and rapid conversion? Or will the whole thing come unglued as reactionary forces bring *perestroika* and *glasnost* to an end and reinstitute a form of aggressive totalitarian control?

Whether the future of the Soviet Union and Eastern Europe is one of reform, revolution, or reaction, those involved in shaping the common defense have neither a crystal ball to see the future nor the luxury of waiting to see how it may go. The realities of national security policy-making in the 1990s will cause us to make fundamental choices among competing priorities that inevitably will limit the range of future options available. From a global perspective, monumental changes are under way that will transform the way we look at national security. Not since the Middle Ages have the five major factors operating on the balance of power—economic, social, religious, technological, and military ones—all changed at one time.

Economically, the United States faces a difficult future. National debt and massive trade imbalances are eroding the U.S. ability to influence events shaping the world. Social problems including global overpopulation, starvation, drugs, crime, homelessness, and AIDS have evaded free world solutions. Religion, as the traditional foundation of many societies, has been shaken by the secularization of the Western state at the same time that Islamic fundamentalism has become a more aggressive geopolitical force. Technologically, the information-processing explosion threatens to overwhelm society with data. Militarily, the Western democracies are losing the option of using force as an instrument of national policy.

Yet the military revolution is in many ways woven into the other four. Throughout history, when radical changes take place in the social, religious, economic, or technological universe, nations evoke the use of force to bring power back into balance. As much as we may wish it to be otherwise, this remains true. These changes generate friction that will lead to conflict. Whether or not the result is bloodshed will depend on how much influence world leaders are able to exercise and on the flexibility of the armed forces to respond and quell conflicts.

But the most important single factor in the global strategic climate is the fading of the Soviet threat. Whether from sheer economic necessity or the result of "new thinking" about the role of force in Soviet foreign policy, Gorbachev's rhetoric has clearly set in motion forces that have been removing the worldwide military threat that has been the bedrock of the U.S. alliance structure.

It matters little whether Gorbachev survives or is replaced by a more conservative leader. The Soviets will be unable to devote a large share of their scarce and diminishing resources to the enormous military establishment they have been constructing. Nor can they continue to support such massive foreign military assistance programs as those in Angola, Vietnam, Nicaragua, and Cuba.

Concurrent with these developments and despite the perception that peace is breaking out, potential threats to U.S. interests worldwide clearly are increasing in the Third World, especially with the proliferation of chemical and nuclear weapons and long-range delivery systems. Such proliferation could lead to or intensify conflicts requiring the employment of U.S. conventional forces. New threats to U.S. security interests in the form of drug

proliferation and terrorism are creating greater demands for both conventional and unconventional military capabilities.

Prospects for Conventional Combat

In light of the disparate combat experiences of the 1980s, along with the prospects for increased danger of conflict involving U.S. forces erupting in the world in the 1990s, new thinking clearly must be applied to the future of conventional combat.

Europe

Because the defense of Europe will remain a primary United States commitment, the changing strategic environment in Europe is still key to defining the future needs of U.S. conventional forces. With or without the CFE agreements, the military balance in Europe will be fundamentally changed, which will require new roles and missions among the NATO allies for residual forces.

NATO's crisis management system may also be hampered by a lack of responsiveness. Although NATO may possess greater warning time, the signals of potentially hostile intent might be too ambiguous to galvanize concerted action by the allies. To prompt decisive action by NATO capitals, the signals would have to be so clear and obvious that it might then be too late to mount an effective defense.

With the conditions for the defense of Europe so altered, what will be the implications for the United States commitment to Western Europe? Much depends on the outcome of the coming round of negotiations on short-range nuclear forces (SNF) and how that might change the balance between the conventional and nuclear components of NATO's strategy of deterrence. The danger is that NATO's long-time reliance on the threat of nuclear escalation will lose its credibility.

In determining NATO's future conventional requirements, the alliance must consider the political and military implications of a lack of SNF. The absence of a nuclear tripwire, embodied by the SNF, will cast doubt on the linkage of U.S. and West European security and may undermine the rationale for placing U.S. troops in NATO's front line.

Changes in Eastern Europe will pose both threats and opportunities to U.S. strategic interests on the European continent. Eastern bloc governments currently seek the obvious advantages of capitalist democracies: high productivity, technological modernity, and individual motivation. But such changes cannot occur overnight in the decrepit systems the emerging East European democracies begin with in 1990. The most acute danger to stability in Eastern Europe is domestic discontent, which is likely to escalate as public demands for increased basic necessities and consumer goods go unmet. Conflict among and within East European states may mount as issues such as cross border trade, ethnic rivalries, and long-suppressed nationalism exacerbate historic sources of conflict. Increased tension and rivalry will introduce a new element to the equation in Eastern Europe. The potential for intra-bloc conflict and even open hostility has never been seriously confronted by the Soviets, their former satellites, or NATO.

The Developing World

The developing world, with its vast resources and population, its widespread armed conflict, its extremes of wealth and poverty, and its incessant political turbulence, represents a combination of U.S. interests and threats to those interests that could be more destabilizing than the U.S.-Soviet rivalry. Catastrophic events in the developing regions could conceivably trigger a collapse in the world economic system that would destroy the basis for U.S. economic and political leadership and way of life.

The security situation in the developing world is critical. Typical of what can be expected through 2002 are insurgencies in El Salvador, Mozambique, and the Philippines and continued fighting in Lebanon, Afghanistan, and Kampuchea. It could get much worse. There could be a renewal of war between Israel and the Arabs or between India and Pakistan. The scope and intensity of such conflict will pose significant challenges to U.S. conventional forces should they be employed. Conflict, terrorism, natural disaster, or the interdiction of drugs may also require military operations in many parts of the developing world.

Bombings, highjackings, hostage seizures, and other forms of terrorism are more likely to increase than abate in the coming decade. Terrorists will operate with increasingly sophisticated equipment and tactics. Not only terrorist strike capabilities but also their ability to counter antiterrorist efforts will improve.

Most likely the industrial powers will continue to progress in reducing the threat of the use of nuclear, biological, and chemical weapons against each other. They are not likely to be successful, however, in preventing proliferation of these weapons in the developing world. With proliferation, the risk of employment will continue to increase. The widespread use of such weapons in the Iran-Iraq War is a harbinger. The United States must anticipate the problem of operating conventionally with its own and allied forces in the presence of the threat of hostile employment of nuclear, biological, or chemical weapons.

The National Security Policy Environment

A fundamental aspect of the American mind-set will continue to underlie the U.S. approach to the use of military force. The legacy of Vietnam is still very much with us and will remain unless there is some unambiguous foreign military challenge to U.S. security. The Vietnam syndrome was manifest even during the years of the "Reagan Revolution" when Defense Secretary Caspar Weinberger established "tests" that had to be met before committing U.S. military forces to action abroad. In brief, the United States will not commit its military to combat unless (1) the risk of failure is very low, (2) the operation is executed very quickly, (3) few American lives will be lost, and (4) the commitment will not disrupt business as usual in the United States. The military operation in Panama in December 1989 exemplified the application of these prerequisites. The success of the action will serve to reinforce the attitudes behind them.

For those accustomed to having 5 or 6 percent of the U.S. gross national product available annually for defense spending, the prospects are dismal. For those who believe that a reduced defense budget will result in a significant peace dividend, the new constraints on defense spending may be good news.

The twin deficits confronting the United States—the federal budget and international trade—will not be significantly mitigated for the foreseeable future, and there will be growing demands for the president to apply increasingly scarce federal resources to solve pressing domestic problems and to restructure American

society to regain competitiveness, especially in the light of Japanese trade competition and the specter of Europe 1992.

Perception of these new realities will lead the U.S. Congress to make deep cuts in the Five-Year Defense Program. Such cuts will follow on the heels of the cuts in defense spending that have been imposed beginning in 1985.

The U.S. defense industry is already internalizing these messages. More than 80,000 enterprises dropped out of the defense business between 1982 and 1987, the heyday of the Reagan defense buildup. Recent trends in defense corporation takeovers by foreign concerns are even more disturbing. Worse yet, U.S. defense firms are investing less in research and development; the corporate boards of directors—largely in response to regulatory pressures on the conduct of defense business—press for short-term profit performance to prevent takeovers. In brief, there is real concern for adequate U.S. defense industry capability to sustain the future requirements for national security policy.

For a host of reasons the United States is engaged in a defense build down. Many have criticized the U.S. administration for not having a strategy to govern the buildup of the 1980s. It is certainly the case that because previous Congresses and administrations were unwilling or unable to make the comparatively easier choices of the 1980s, the Bush administration and the 101st Congress face some perplexing dilemmas. It was wasteful to build up without a strategy; it will be dangerous to build down without a strategy. The United States has had four build downs before, and it is instructive to recall the nature of the build downs that preceded the current one.

After World War I the United States dismantled its military industrial complex. It devoted less than 1.5 percent of its collective wealth to national defense each year between 1920 and 1937. Pearl Harbor shook us out of our isolationist shell; the nuclear age made that turnaround irreversible. After World War II we again demobilized our military machine, with defense spending in 1947 dropping to 3.7 percent of gross national product. We knew we did not like what was happening in the Soviet-occupied sectors of Eastern Europe, but we hoped we would be able to return to our neo-isolationist North American ways. When the Soviets rattled their sabres more ominously in the Berlin crises, then exploded an atomic bomb of their own much earlier than anticipated, the United States got seriously

worried. When the attack on South Korea came in 1950, we became convinced that another global war was in the offing unless once again the country mobilized for conflict.

After the Korean War, the United States again demobilized and sought to cash in on the "peace dividend." Yet the simultaneous pursuit of the Great Society and the U.S. involvement in yet another war claimed a larger proportion of the national wealth. In the post-Vietnam build down, by the end of the 1970s, the Soviet Union had clearly taken advantage of détente to embark on a massive military buildup and modernization program of unprecedented scale. Once again, the United States had to rebuild its defenses after a period of allowing its forces to become "hollow."

If the United States once again builds down by neglect, we may in the process project a weakness that could again result in conflict and war. As we build down we must strategically choose how to restructure U.S. military forces to deal with the threats to U.S. values, institutions, and a way of life that, as we look ahead to the future, we can now see only dimly.

The Character of Combat

U.S. conventional forces have been designed primarily with the European theater in mind. U.S. air and ground force planners envision an integrated aerial and ground operational concept—promulgated officially as AirLand Battle—employing forces in accordance with the principles of agility, initiative, depth, and surprise. Naval force planners envision a maritime strategy that aggressively projects offensive power to prevent any adversary from threatening the U.S. control of the seas. These concepts will be obsolete by the year 2002, if they are not already. Indeed, the outcomes of the wars of the 1980s have essentially invalidated the doctrines currently driving U.S. conventional forces.

The nature of warfare at the conventional level has undergone profound change. This change must be understood in order to develop the force structures, doctrines, and technologies needed for success in conventional combat of the future. Conventional warfare must be conceptualized based on the expected level of intensity—high, mid, or low.

II

Combat Lessons Learned

Despite the high premium attached to learning the lessons of the past, senior military leaders often comment after a war that nothing in their academic preparation trained them for the war they had just fought. In large part this is because war is exceedingly complex, yet we tend to oversimplify it.

It is impossible to be exhaustive in a policy study such as this; not every conventional war could be covered. We selected a number of examples in which we could have access to good information from primary sources. These examples were taken from

- Afghanistan, 1979–1989
- Grenada, 1983–1984
- The Persian Gulf, 1987–1988
- Panama, 1989

A variety of approaches and authors were employed. The assessment of the 1989 Panamanian operation was compiled in a seminar based on media reports and personal accounts of participants relayed to the project staff. Dr. Stephen Blank of the U.S. Army War College staff provided an analysis of the Soviet lessons learned from the Afghanistan conflict. For lessons from Grenada and the Persian Gulf, we heard from senior U.S. participants themselves: Gen. Norman Schwartzkopf and Adm. Henry Mustin. This array of case studies, personalities, and methodologies provided a rich matrix of perspectives on combat lessons learned. There was a remarkable degree of consistency among the conclusions derived from the cases.

Soviet Lessons Learned in Afghanistan

From the Soviet point of view, Afghanistan was a war of two distinct campaigns, the first being their initial invasion of 1979–1980 and the second, the subsequent battles of attrition from 1980–1989.

The initial coup d'état—the occupation of Kabul and other cities—replaced a disintegrating, recalcitrant regime with a pliable one and provided breathing space for the Afghan army. At the tactical level it was a complete success and validated many elements of Soviet doctrine and strategy.

The Soviet Union succeeded in completely surprising Afghanistan, Pakistan, and the United States, despite numerous warnings and intelligence analyses suggesting that the invasion was in the offing. The operation exemplified the use of airmobile troops coordinated with both rapidly advancing ground troops and intelligence on the ground, and it involved the successful implementation of *Maskirovka*, which includes cover, concealment, and deception. The use of satellite communications as the link to Moscow demonstrated their utility for power projection purposes and missions involving force projection.

The entire operation validated for the Soviets the correctness of making the enemy's command, control, communications, and intelligence (C^3I) and aerial platforms (missile and air bases) the main targets of strikes and missions to assure their rapid neutralization. These aspects indicate that the Soviets have upgraded the role of electronic warfare from support of combat operations to one of being an independent combat arm.

Subsequent to the invasion, Moscow adopted a conventional strategy of seizing the cities, controlling the main roads, and converting the cities into government strongholds. Soviet forces also sought to engage the enemy with conventional armored sweeps using extensive artillery preparation. As is well known, these sweeps were quite standardized in both preparation and execution and thus forfeited surprise.

The Soviets' numerous and repeated failures of C^3I during the first campaign are directly traceable to their uniquely high degree of authoritarianism and heavy mechanization. These failures impeded commanders' abilities at all levels to visualize

correctly the nature of either the war or the operational level and content of the engagements in which they participated.

Soviet operations also showed very spotty use of intelligence. Target acquisition and follow-up strikes were rarely successfully coordinated; leaks were regular. All these conclusions cast doubt on the Soviet military's capacity to adapt itself to the new requirements of the reconnaissance strike complexes, let alone to adapt to the new generation of information fusion systems that are entering regular military use.

The second phase—beginning in 1980–1981 and gradually expanding until 1988—manifested itself in changes in Soviet force structure and military art. Soviet forces became lighter and more airborne, and the aerial arm, both fixed wing and rotary wing, was called on to provide close air support, interdiction, and destruction of enemy supply positions and logistics (i.e., economic warfare along the lines of a scorched earth strategy), as well as provide for Soviet troop mobility and logistics.

In this period, the vertical envelopment, or hammer-and-anvil operation, reached the level of a paradigm that required commanders to synchronize simultaneous air and land attacks based on accurate military intelligence regarding target locations, size, and enemy force strength. These envelopments were applied in both offensive and defensive operations.

Soviet combat experience indicates that these various forms of airmobile forces (air assault, airborne, heliborne) can perform deep raids (with or without "special forces"), reconnaissance in force, vertical and/or amphibious encirclement, coups d'état (i.e., independent seizure or neutralization of the enemy's C^3I), surprise attacks, or flanking operations. Whether mounted or not, they can carry their own artillery or indirect fire strike systems and accomplish operational or even strategic missions. Their presence contributes further to the spatial expansion of the battlefield, the likelihood of economic war, and the importance of both reconnaissance strike complexes and real time intelligence.

Although overall Soviet military performance has been poor, it does appear that by virtue of a successful transitional strategy, including success in the crucial political domain, victory has been snatched from the jaws of defeat.

The Soviets themselves have mounted a "lessons learned" campaign to take advantage of their Afghan experience. *Afgansty*, as the Soviet veterans at the Afghan War are called, are being

promoted either into command positions or into prominent educational posts in the Soviet military educational network and are being identified with the "glorious traditions of Soviet military heroism."

The Soviet strategy failed by overreliance on airpower to substitute for combat power. Commanders and troops were reluctant to move at night, fight dismounted, or pursue aggressively. Commanders showed a consistent inability to control or coordinate air and ground strikes and relied too much on a single operational form, *Blokirovka*, the vertical envelopment of hammer and anvil. Unsuited to the terrain, these techniques demonstrated the poor physical training of many Soviet conscripts.

On the whole, unimaginative and rigid tactics and operational art caused a negative synergy of a systemic nature. And precisely on this nexus Gorbachev and the Soviet military reformers have concentrated their fire. If Gorbachev is successful, a dramatically reformed Soviet military would aim to reshape conventional combat in 2002.

Soviet Conventional Combat 2002

Based on this analysis of Soviet lessons learned from the Afghanistan conflict, some patterns may be discerned that are likely to emerge for the Soviets as they approach the next decade. There will be intense efforts at surprise and *Maskirovka*, primarily targeted at C^3I and air and missile bases in the first strike. Indeed, an independent operation designed to win rapidly and avoid the possibility of attrition may develop while at the same time an enormous battle for superiority also develops in the air, replete with space-based systems and an enormously complex electronic warfare battle.

At the beginning, the front will be vast. Lines will be fluid, and troops will be simultaneously engaged in both offensive and defensive operations in an interspersed fashion. The Soviets will rely heavily on the various forms of airborne troops and naval infantry, including the *Spetsnatz*, their various special forces and diversionary-reconnaissance forces. The ultimate tactical objective will be to obtain scope and freedom to move. At

higher levels of combat the ultimate objective might well be to behead, or disorient, the enemy's central nervous system to the point at which it is unable to issue commands, control troops, and communicate with them.

Using a new generation of high precision weapons and information fusion systems, economic and countervalue targeting will be extensively destructive. Defenses will be fortified, layered, heavily mined, and probably entrenched as well. Moreover, a possible return to siege warfare on a broad front cannot be ruled out.

There will be a continuing effort to reform force structures in the direction of mobility and lightness as well as combined arms. Yet the unprecedented destructiveness of weapon systems will come up against unprecedented requirements for support in a war.

Grenada, 1983–1984

The first lesson learned from the U.S. action in Grenada, operation Urgent Fury, was that, in the planning stages, overreliance on best-case planning is a poor way to prepare for combat operations. The U.S. planners assumed that the Cubans and Grenadans would not put up much resistance and that U.S. forces would be finished within 48 hours. The mistake was to plan for that outcome and not to hedge against the likelihood of the fog of war causing things to go wrong.

Second, the rules of engagement were too strict for the situation. The force was told to cause absolutely no collateral damage. These rules intimidated the tactical commanders in such a way as to hinder combat operations unnecessarily. The rules of engagement should have allowed for greater flexibility in the judgment of the senior commanders on the ground.

The timing of the operation was critical. The single greatest mistake was to change the start time from 0200 to 0500. When the first aircraft were delayed until 0530, the operation could not enjoy the cover of darkness for the initial assault. Also, the plan was not well developed because it was drawn up so hastily and in such a compartmentalized manner. The planners had about 52 hours from the moment they were told to put the plan

together to the time the first combat elements hit the ground. And, because the planners were so concerned about operational security, few of the necessary additional planning agencies—even those in intelligence and mapping—were brought in on the planning. Clearly speed, timing, and operational security were achieved at the expense of planning time, but in the Grenada operation a satisfactory balance among these competing considerations was not achieved.

Furthermore, in terms of command relationships, the operation was unsatisfactory. Not at all a joint structure, it was largely commanded by the navy and there was very little air force representation. As it turned out, U.S. forces had conducted numerous exercises in the region in the immediate past, but none of the experience or expertise was captured into the Urgent Fury planning process or the command relationships. This lack had its most noticeable effects on integration of fire support. The force was not able to integrate the navy, marine, air force, and army fires and thus was a most unsatisfactory combined arms operation.

Moreover, communications interoperability among the services was problematic because not all the systems had compatible operating characteristics. At the same time, the lack of a clearly established chain of command and the absence of an effective communications plan caused much confusion, sometimes resulting in conflicting orders being issued. Orders that seemed consistent at headquarters often did not make sense on the ground in Grenada. The task force commanders at the scene were tied to an ambiguous chain of command from which emanated orders that were sometimes out of touch with the realities of the situation.

Many administrative and logistics details turned into nightmares during the operation. The one that received the most mention afterwards was the lack of good maps. Actually, several good maps were used, but they were not standardized, nor were consistent grid systems overlaid on all the maps even when the basic maps were the same. Moreover, medical planning was a disaster waiting to happen. Had there been more casualties, U.S. forces would not have been prepared to handle treatment and evacuation on a larger scale.

The Persian Gulf, 1987–1988

The Iran-Iraq War of the 1980s was one of the twentieth century's largest; but it was mostly a land war. Prior to U.S. entry into the conflict, action at sea was a minor sideshow. Moreover, the politics of the Persian Gulf are Byzantine; the Kuwaiti request for U.S. assistance to protect their shipping, which resulted in the deployment of additional U.S. forces, came as a consequence of a convoluted set of strategic and political events that never could have been anticipated.

At the time, while U.S. naval force structures were adequate in quantity, commitments elsewhere in the world were not honored because of the size of the force required in the Gulf. This operation was the first test of new procedures put in place in the 1980s as a result of the Goldwater-Nichols Act, the interface of the Pacific and Central U.S. Commands (Commander in Chief Pacific [CINCPAC] and Commander in Chief Central [CINCCENT]), and the first instance of NATO member state forces cooperating in operations out of the NATO area under the aegis of the alliance.

One particular operation was Praying Mantis. It began with a response to the mining of the USS *Roberts* involving the destruction of Iranian oil platforms in the southern Persian Gulf. Later in the day Iranian small boats attacked U.S. flagged vessels and a barge. A U.S. aircraft responded by firing at the three Iranian boats, destroying one and disabling another while the third fled the scene. The height of the action was a major naval and air engagement in which U.S. forces combined to sink one Iranian frigate and destroy another; a third surface combatant was destroyed; one Iranian F-4 was possibly damaged; and other aerial targets were fired at, which later analysis determined were out of range.

The action demonstrated that the force structure needed for this kind of combat must be rather large in order to surge to such a capability quickly and to sustain it without major degradation in other commitments. It also demonstrated a need for a different kind of force structure than currently maintained because forces designed primarily for the NATO maritime war are not necessarily optimally suited for combat in Third World operations. Moreover, this first-ever case of NATO cooperation

in out-of-area operations demonstrated that certain features of rationalization of NATO roles and missions must be reexamined. More precisely, the assumption that U.S. allies would maintain a mine/countermine capability that the United States could draw on proved to be faulty because the allies initially chose not to support U.S. forces.

At the outset, command relations for this operation were very difficult. Bitter feuds broke out, ultimately resulting in the loss of command for a four-star flag officer. In the future, issues related to the Unified Command Plan must be sorted out well in advance to include nondefense agencies and nongovernmental bodies. Ultimately, the regional commander in chief must be clearly designated and must have total operational control over all forces in the area.

At a tactical level, this operation proved the timeless truth that intelligence available will never be good enough to satisfy the needs of the commander. In the future, plans must be flexible enough to allow maximum delegation of authority for the most likely alternative scenarios, and available resources must be sufficiently flexible to be adaptable to unforeseen situations. CINCs need to have command of some resources to be able to procure equipment off the shelf and to draw on resources available for other commands on short notice without having to go through normal logistics and budgeting procedures. The commander in chief of the Central Command (CINCCENTCOM) even had to conduct his own developmental work to modify equipment and build systems not available for his unique needs. This may translate into a need for a kind of DARPA-Forward, from the DOD's Defense Advance Research Projects Agency, to deploy to combat theaters in time of crisis.

When the shooting starts, the fog of war still obscures the view despite all the new equipment. Global communications capabilities were both a nuisance and a help to the fight. Weapon crews generally did not open fire at maximum effective range because of the uncertainty of the identity of the target and because of the heavy background density of noncombatant traffic. Electronic warfare data was confusing and often misleading. Damage control and medical competence were critical; these operations require extensive training. Damage control training based on the experience of the USS *Stark* 11 months earlier saved the *Roberts*. Training, in general, must be as

realistic as possible, and much of what is needed for combat should be live fire and cannot be simulated.

Finally, the problem with data in this kind of combat was too much data and not enough information. Command, control, and communications philosophies that rely on centralization will inherently fail to help the commander win battles. In particular, the C^3I concept was overcentralized in the Gulf and did not work.

Panama, 1989

In brief, the initial reports from the Panama operation Just Cause indicate that, doctrinally, considerable progress in the planning and execution of joint contingency operations has been made since Grenada. Command and control procedures have been greatly improved. The training system worked; squad and platoon level live-fire exercises conducted in training had an especially powerful payoff in combat for those troops undergoing their baptism by fire.

In terms of technology, U.S. forces derived the greatest leverage from the use of night vision devices. This constituted a significant technological advantage, permitting U.S. forces to own the night and defeat their Panamanian opponents on their own turf.

Organizationally, the importance of flexibility in task organization was confirmed in this operation. Moreover, a new concept, that of the "combat lifesaver," was tested in battle and proved its worth. This structure calls for doctors and physician assistants to focus their attention on only the most seriously injured while specially trained unit personnel carrying more than the usual first aid packs were left to handle the basic lifesaving and treatment of the rest. This system worked in Panama.

Closer scrutiny and more informed judgment must await the test of time.

Summary

In conventional combat in 2002 the traditional levels of analysis of military operation—tactical, operational, and strategic—are compressed into one. The actions of troops, when viewed around the world on a live television report, take on strategic impact. Thus when, in Panama, there was concern about the Americans held in the Marriott Hotel, a company commander was ordered to send a squad to take some action, any kind of action. This was not necessarily good or bad; but it did take on strategic importance in light of the media attention.

A premium will be placed in future conventional warfare on correct execution the first time. The young people in the armed forces will likely be under fire for the first time, and they must react correctly instantly. The medical systems must work, the command control system must work, and the massive communication systems must work to coordinate assaults, naval gunfire, close air support, interdiction, medical evacuation, and logistics. All must spring into action at the start and function nearly perfectly. Such operations take practice, practice, and more practice.

It is as likely in 2002 as ever that the mission will be vague. For example, during the April 1988 deployment of forces to Honduras for operation Golden Pheasant, the battalions involved did not receive their mission statements until they had actually been in Honduras for about six hours and were moving out to a hilltop for an assault with ammunition. When the first C-141 landed no one knew whether or not they were going to fight on arrival. That decision is a function of the speed with which such deployments must be conducted and is not necessarily a breakdown in concern or expertise; the requirement gets ahead of the mission.

The opponent in future conventional combat is probably going to be as well armed as U.S. forces. That U.S. troops are better armed than any they are likely to oppose is a popular misconception. But with the proliferation of sophisticated weapons in the Third World just about any fight that U.S. forces get into, at least initially, will be against forces that are at least as well armed, fighting on their home ground, not exhausted from 36 hours of mission preparation, and probably pretty mad that U.S. troops have come. They may even have been forewarned.

Most probably, they are carrying out plans that they have long rehearsed.

The first combat lesson to be learned from conventional combat of the 1980s is the time-tested principle of war: unity of command. For every objective there must be a singleminded effort under one responsible commander. This tenet extends up the chain of command to the highest national levels where political objectives are set and articulated down to the lowest tactical levels where the instructions are formulated to carry out those political objectives. Disaster occurs, as in Beirut in 1983, or is narrowly averted, as in Grenada in 1983–1984, when political objectives are not clearly defined or when they change faster than forces can adjust. Where objectives are clear and lines of authority are explicit, as in Panama in 1989 and, ultimately, in the Persian Gulf in 1987–1988, the inherent advantages of U.S. fighting forces can be brought to bear to carry the day.

Technology never dominates war; people do. Although technology can provide certain advantages, as it did for the Israelis in the 1982 Bekaa Valley conflict, technology can just as easily hamper the effective application of force, as was the case with the Soviets in Afghanistan or with the general U.S. experience in insurgency and counterinsurgency (Afghanistan being the principal U.S. exception). In particular, the U.S. fascination with ever more centralized command and control technologies may prove to be more harmful than good. Abandoning high technology applications for solving command and control problems is not the answer, however; rather, the need is to use technology to allow greater distribution of intelligence, command, and control across the entire battlefield. In this manner, the superior flexibility and creativity of the individual U.S. fighter can be magnified.

Finally, conventional combat of the 1980s clearly demonstrates that the human dimension always dominates in war. As the Iranians, Iraqis, British, and Argentines painfully learned, no technological "silver bullet," clever doctrinal scheme, or innovative organizational structure can overcome the problems of combat; only people can. For 2002, as budgets shrink, efforts to recruit, train, and retain the highest calibre soldiers, sailors, airmen, and marines must not be cut short. Investments in personnel, training, and readiness will have a high payoff and will be more important than basic research, development of new systems, or procurement of new weapons.

III
Mid-Intensity Conflict

Deciding on the characteristics of mid-intensity conflict (MIC) probably has become the most important task for U.S. military planners over the next few years. With the decline of the Soviet military threat to Europe, conflicts that might be termed "mid-intensity" will dominate U.S. planning concerns. The potential for U.S. involvement in mid-intensity conflict—wars with or between powerful regional states—will provide a key justification for military budgets during the 1990s and will establish most of the threats against which U.S. forces are sized, trained, and equipped.

The Nature of Mid-Intensity Conflict

The definition of mid-intensity conflict therefore assumes great importance. U.S. planners must understand the sorts of wars for which they are preparing so they can invest in or create the right force structures, technologies, and doctrines.

The "intensity" of a conflict is a function of the nature of the threat, the level of technology applied, and the amount of force that can be brought to bear given U.S. lift capacity and domestic and international political sensitivity. That definitional framework suggests three broad categories of conflict: low-, mid-, and high-intensity. Low-intensity conflict (LIC) is political-military confrontations at a level below general conventional war but above

routine peaceful competition among states. It consists of insurgency, counterinsurgency, counterterrorism, counternarcotics operations, peacetime contingency operations, and the use of peacekeeping forces. High-intensity conflict (HIC), on the other hand, would consist of a conventional (non-nuclear) war of tremendous scope, most likely a major world war involving the superpowers.

Mid-intensity conflict essentially includes all the wars in between. In the case of the primary scenario to be developed later—for example, U.S. involvement in a conflict in southwest Asia—each of the three variables of the definition of intensity are different than they would be for either LIC or HIC. The mid-intensity threat to U.S. interests is greater than the low-intensity threat in, say, El Salvador, but lower than the high-intensity threat in Europe. Although southwest Asian states increasingly include front-line superpower combat systems, the technologies those states apply are on the whole of a lower sophistication than the technologies of the superpowers, but greater than those applied in LIC. Strategic lift shortfalls and political constraints suggest that the United States could not bring in nearly as much force to bear as it could in Europe, given the present level of U.S. forces assigned to that theater. The general recognition of a threat to U.S. and allied raw material supplies, however, would allow a more forthright response than the United States has been able to make in El Salvador or the Philippines.

The manner in which the United States would be forced to address a potential conflict in southwest Asia (or, potentially, in Korea or other MIC arenas) therefore differs significantly from the way it would fight more traditional, high-intensity wars. U.S. leaders could not make either as rapid or extensive a deployment of forces, nor sustain its commitment for as long. At the same time, however, the interests involved are arguably less than vital, and the enemies involved do not possess all the most advanced weapons characteristic of Soviet military forces.

Scenarios

During the 1990s it is extremely probable, almost a given, that many of the same economic stresses and desires and impatience for freedom that spurred change in Eastern Europe will spread to the Third World, to Communist and non-Communist regimes alike. The resulting political upheavals and instability will produce new and complex threats to U.S. interests, most of which will undoubtedly be political and economic in nature but some undoubtedly will be military. In the long term these military threats may even prove more challenging than the danger posed by Soviet forces, in part because we so poorly understand many developing states.

U.S. involvement in MIC will probably stem from two primary sources. First, the United States maintains security treaties or relationships with dozens of nations across the globe, including Canada, Israel, Saudi Arabia, Turkey, Greece, and South Korea. Any of these commitments could someday demand the deployment of actual combat forces. Second, MIC in the developing world in many cases could threaten U.S. and allied access to critical raw materials, including petroleum products but also critical minerals. A Soviet or Iranian grab for oil or power in southwest Asia, for example, would carry the risk of disrupting the economy of the free world.

This report examines two primary scenarios involving the sorts of considerations detailed in the preceding analysis and meeting the definition of MIC outlined above: a conflict in southwest Asia and a new North Korean attack on the South. The bulk of the literature on MIC treats a conflict in southwest Asia as the prototypical MIC scenario, and for good reason. That region is more politically instable than any other on earth. A war in southwest Asia would meet the definition of MIC: southwest Asian states do not possess completely modern armies, and conflicts there would pose second-order threats to U.S. interests (unless a complete oil cutoff appeared imminent). Also, the force that the United States is capable of bringing to bear would be limited, perhaps severely so.

Early twenty-first century war in southwest Asia will grow toward the "high-intensity" end of the spectrum of conflict. From the perspective of a U.S. military planner, conducting

military operations in southwest Asia may offer more challenges than future European contingencies, in part because arms reduction and operational arms control agreements will reduce force concentrations in Europe while the regional arms competition continues unabated in southwest Asia. Nevertheless, it cannot be disputed that a war in Iran would not be as "intense" for the United States as a whole than a war against the Soviet Union (though, as is often pointed out, for a soldier in a foxhole there may be little difference between the two).

For the project, the southwest Asian scenarios focus on two contingencies: (1) a renewed Iranian-Iraqi conflict that spills over into the Gulf Cooperation Council (GCC) states and that demands a U.S. response, and (2) direct Soviet intervention in the Persian Gulf. In the first contingency, two political coalitions would form, with the one around Iraq drawing closer to the GCC countries and the one around Iran continuing its cultivation of more radical Arab countries such as Syria and Libya.

To counterbalance what it would perceive as an accelerating Iranian rearmament, Iraq might seek military relationships with Egypt and India; meanwhile Iran would seek closer ties with the Islamic states of Pakistan and Afghanistan—and both Pakistan and India could possess nuclear weapons by 2002. The Soviet Union would probably desire no expansion of its influence and would continue to be involved in its own internal reforms, although it would have great concerns about the stability of its own Muslim areas adjacent to Iran.

In the first contingency, domestic unrest in various countries—motivated by either economics or religion—could create new tensions that might spark renewed Iraqi-Iranian fighting, which would then threaten to draw in surrounding states, particularly Kuwait. The United States would perhaps decide to intervene to protect Kuwait and Saudi Arabia, and hence the West's oil supply, and to forestall any Soviet thought of intervention. If Iran then initiates tactical missile attacks and an amphibious invasion of Kuwait, the United States would begin the commitment of air and naval forces to the conflict.

The second contingency depicts a new Great Russian regime arising from the ashes of Mikhail Gorbachev's failed program of reform. A new Russian government might attempt to align regional states against Iran to seek a final solution to the threat of Persian imperial ambitions. Iran, for its part, would then begin efforts to incite rebellions among the Muslim peoples

still in the southern Russian empire. Open warfare would then appear imminent, and several regional states—including India, Pakistan, Iraq, Kuwait, and Saudi Arabia—would then become embroiled. At that point, the United States would have to decide to make a commitment and, if so, of what nature.

Both the southwest Asian contingencies demonstrate the problematic nature of mid-intensity conflict. Potential opponents for the United States possess many high-technology systems—advanced fighter aircraft, modern tanks, accurate and destructive antiship cruise missiles, ballistic missiles with increasing range and accuracy, and chemical and even nuclear weapons. Yet the vast distances involved, the need to partially mobilize airlift and sealift assets, the lack of a political consensus on a forthright U.S. world role, and other factors combine to limit severely the scope of a potential U.S. response.

The other potential MIC scenario would be a North Korean attack on South Korea. By the Mutual Defense Treaty of 1954 the United States is pledged to the defense of South Korea, and, since that time, the South has emerged as a burgeoning democracy. South Korea has become most important to the United States as a trading partner and source of a shared strategic vision for Northeast Asia. Few in the United States doubt that it would go to the aid of South Korea in a war; almost no one would argue that the United States should not. The relevant question is what sorts of conventional forces the United States should maintain to meet its commitment to South Korea and to fight in a potential MIC on the Korean peninsula.

There is little doubt that a second Korean war qualifies as a mid-intensity conflict. The security of South Korea, while important to the United States, is not on the same level as the U.S. commitment in Europe or even southwest Asia. North Korea deploys a few advanced Soviet combat systems such as MiG-29 aircraft or SA-5 antiaircraft missiles, but most of its inventory is far older—T-62, T-54/55, and even T-34, tanks, MiG-21 and MiG-23 aircraft, and other such systems. And the U.S. response to a North Korean attack would be constrained by U.S. shortfalls in strategic lift and by the public opposition sure to arise.

Aspects of Mid-Intensity Conflict

The two examples have pointed to a number of generic features of MIC that themselves provide insight into the conventional force structures, doctrines, and technologies best suited for MIC. Planning for mid-intensity wars offers difficult challenges, particularly in an era of shrinking defense budgets. The issues facing MIC planners can perhaps be broken down into the basic areas of military planning: mission, enemy capabilities and intent, environment and terrain, assets (personnel, weapons, and equipment) available, and supporting services.

The Mission

The mission of U.S. forces in MIC should be relatively clear: to engage and defeat traditional armies, navies, and air forces of nations that choose to assault U.S. interests throughout the developing world. That such wars will occur cannot be disputed; that they may involve U.S. forces is obvious. As suggested above, traditionally organized U.S. conventional forces, if they engage in major combat at all, will probably engage primarily in MIC in the decades ahead.

Yet U.S. intervention in ongoing mid-intensity wars is not at all foreordained. U.S. planners must determine if military action would achieve the desired result or would be more or less likely to elicit a Soviet reaction than no action at all. Many writers have recently echoed syndicated columnist Walter Lippmann's notion that, as the relative degree of U.S. power in the world declines, U.S. strategists must reassess the number and firmness of the country's military commitments. Whatever the theoretical validity of that assertion, the present peaceful and fiscally stringent era most likely will not support large defense budgets, and selective fulfillment of commitments will become necessary. The results of U.S. geostrategic thinking will therefore affect planning for MIC: If the United States were to decide to alter its commitment to South Korea to consist entirely of air and naval forces, for example, U.S. army force designers would not need to include Korean contingencies in their thinking. Thus, the strategic review of the roles and missions of U.S. forces that surely will come with shrinking defense budgets will set the stage for the force structures, doctrines, and technologies for conventional combat.

The Enemy

The enemy facing U.S. forces around the globe—in Northeast and southwest Asia, Africa, and the Americas—will vary according to the conflict, but military forces in these developing regions are growing in sophistication. In many countries today the United States will face large, professional armed forces deploying advanced weapons in significant numbers. These can include main battle tanks and armored personnel carriers, heavy and mobile artillery, front-line Soviet aircraft, integrated air defense systems, new construction diesel submarines, cruise missiles, ballistic missiles, advanced surface-to-air missiles, and even chemical and tactical nuclear capabilities. By the year 2002 a number of these countries are almost certain to possess credible space surveillance and antisatellite capabilities. Differences in training, morale, leadership, and other critical areas will persist, and it can be assumed that these differences will favor the United States as long as the United States does not undercut them during the current round of budget reductions.

Environment and Terrain

As with the potential enemies, the environment and terrain of mid-intensity wars will vary immensely. Some areas, particularly portions of Africa and the Middle East, offer open terrain for which tactically mobile forces with heavy firepower are required. Much of Iran and Korea consists of mountainous areas best defended by lighter forces enjoying heliborne mobility. Some nations in Africa, Southeast Asia, and the Americas contain large areas of forbidding jungle only passable by foot soldiers, while the growing industrialization and economic development have led to increasing urbanization in many Third World nations. Air and naval forces as well must be equipped and trained to fight during the night, through the extremes of heat and cold, and in the worst weather and environmental conditions. Amphibious forces will be challenged to land with surprise on forbidding coastlines. The MIC environment and terrain therefore will call for a wide range of forces.

What assets does the United States have available to meet potential mid-intensity wars? The answer to this question will be resolved over the next several years as defense budget cuts force all the services to reshape themselves to lower sizes. Most likely, U.S. commanders in chief will have forces from each of the services.

Army forces will probably include light infantry, airborne, air assault, heavy mechanized, heavy tank, and ranger units. Air force assets will be capable of long-range penetration and interdiction and will include some B-2/B-1B bombers, an A-12 medium attack/FB-111 bomber force mix, improved versions of the F-15 and F-16 fighters and perhaps an advanced tactical fighter of new design, an F-16 close air support aircraft, and possibly C-141 replacement aircraft. Naval units will include aircraft carrier battle groups and submarines (both with sea control and power projection capabilities), patrol aircraft, and marine expeditionary forces. Strategic sealift assets will include the U.S.-owned commercial ocean carrier fleet, the Military Sealift Command Fleet (mostly tankers and freighters), the afloat prepositioning force, some fast sealift and auxiliary crane ships, and a minimum of 95 ships in the Ready Reserve Force. The government-controlled National Defense Reserve Fleet and U.S.-operated foreign flag ships would probably not be available without full mobilization. Long-range conventional cruise missiles will provide precision strike capability from air-, and sea-based platforms operating outside the immediate region of combat.

The United States is also pursuing an increased measure of service interoperability. U.S. forces will face combined arms teams in mid-intensity warfare, so they must be able to operate as such themselves. This injunction is nothing new to the services, but combined arms operations and jointness must receive even more emphasis than they do today. In MIC, when U.S. forces are operating far from home and are probably outnumbered, close interservice coordination will constitute a sorely needed force multiplier that might make the difference between defeat and victory.

Supporting Services

Finally, the U.S. planners must take great care to examine the contributions of supporting services to their plans for MIC. Intelligence and early warning will assume increasing importance as the size of U.S. forces shrinks; when fewer forces are available, they must be employed more efficiently. Because the United States will probably not have any troops immediately on the scene of a MIC conflict, strategic lift—both by air and by sea—will determine the nature, scope, and duration of the U.S. military commitment. Once a force has been inserted, it must

be supplied, and good logistics will be indispensable for successful operations. Efficient command and control of U.S. forces may provide the margin of victory against states whose force numbers are greater than those of the United States but which are poorly handled.

The U.S. military has placed insufficient emphasis on these sorts of support functions and continues to do so today. The army relies heavily on the reserves for its supply and support services and does not give them adequate priority for resources—an arrangement not responsive to the demands for rapid responses to mid-intensity conflicts. The navy prefers mothballing to maintaining effective ready reserves; only the air force has had some success in this.

Recommendations

Given the sorts of wars to which MIC points, however, the analysis above leads to several major recommendations for U.S. military policy toward such wars:

- *Place greatest emphasis on the quality of military personnel.* The U.S. military will not be able to fight any wars successfully—be they low-, mid-, or high-intensity—without expert, motivated people. Recruiting, training, and retaining high-quality personnel ought therefore to be among the top priorities for the U.S. military.
- *Examine logistics problems more thoroughly.* As noted, the U.S. military currently places insufficient resources emphasis on the logistical aspects of military operations for sustaining mid-intensity conflict. Improving the logistics aspect of U.S. operations in MIC would require three steps.

  First, the Department of Defense (DOD) must look at U.S. supply and support capabilities more carefully than it has in the past; it might consider, for example, shifting some U.S. army support units from the reserves to the active force to increase its readiness.

  Second, the DOD must aggressively manage and monitor the elements of strategic lift, both air- and sea-based, both because MIC conflicts will probably occur where no

U.S. troops are present and because as the United States gradually loses its overseas bases it will require better power projection capabilities. Furthermore, the National Security Council Policy Coordinating Committee must ensure implementation of National Security Directive 28 concerning national security sealift policy. Without a coordinated interagency effort in this regard, U.S. MIC capabilities will be inadequate. Continued reliance on the maritime prepositioned forces is required. A coherent airlift doctrine must be implemented by a rational mix of aircraft. The C-17 must be developed and added to the fleet.

Third, the U.S. military must examine new technologies aimed at easing the logistics burden of long-distance commitments to mid-intensity scenarios. For ground forces, these technologies might include electromagnetic guns and other new weapons not needing a significant ammunition supply, engines using alternatives to fossil fuel, and weapons like automatic or robotic tanks that use fewer personnel. For air and naval forces, these include smart weapons in place of unguided conventional munitions and improved reliability, maintainability, and fuel efficiency in weapons platforms.

- *Obtain a capability to deal with opposing combined arms and heavy forces.* As noted above, many Third World states are acquiring increasingly sophisticated arsenals. Any U.S. forces designed for operations in MIC must be able to defeat opposing combined arms heavy forces in any sort of terrain. This demands a light, direct-fire tank killing system of some sort, though it is not clear whether that ought to be a wheeled system like the marines' light armored vehicle (LAV) or a tracked light tank. The requirement to combat heavy forces in potentially open terrain also suggests that the United States cannot count on light infantry divisions (LIDs) as currently organized to perform that mission adequately. The United States must explore new options including middleweight ground forces, carrier battle groups, and long-range penetrating aircraft to defeat the MIC combined arms heavy force threat.

- *The United States must develop an antitactical ballistic missile* (ATBM) *system* to counter the growing threat from ballistic missiles in the Third World. Nations throughout southwest and Northeast Asia as well as Africa and Latin America are acquiring advanced ballistic and cruise missiles, some with ranges of over 1,000 miles and a few with great accuracy. Future U.S. operations in these areas will be threatened by such systems, and U.S. forces must have a defense and perhaps a counteroffensive system to deal with them.
- U.S. *forces designed for* MIC *must be capable of operating in a chemical or nuclear environment* to the same degree as U.S. forces operating in Europe. Dozens of developing states possess chemical weapons already. A few possess nuclear weapons, and the spread of nuclear and chemical warfare technology is likely, if not inevitable. U.S. forces in MIC must not be completely vulnerable to attack from either sort of weapon.
- *Continue to modernize air superiority fighters* to meet the threat of advanced technology aircraft and weapons, which will no doubt proliferate to a far greater degree than seen today.
- *Emphasize improvements in carrier-based aircraft.* The payload and stealth capability embodied in the A-12 attack aircraft will provide the weapon of choice in many scenarios and will enable power projection forces to penetrate defenses, deliver accurate ordnance, and survive to fly additional missions.
- *Improve shallow-water antisubmarine warfare* (ASW) *capabilities within the navy and revitalize mining and mine countermeasure forces.* The most likely submerged threats to U.S. forces will be met in shallow waters. And as seen even in the recent Persian Gulf contingency, reliance on allied mine countermeasures assets outside of NATO scenarios is unwise.
- *Provide long-range conventionally armed aircraft* to deliver cruise missiles and massive conventional firepower. At the higher end of MIC, such capability will be necessary to secure U.S. political and military objectives.

- *Field long-range cruise missiles and stand-off weapons* for delivery by U.S. Air Force aircraft and U.S. Navy aircraft, ships, and submarines. These weapons provide both the National Command Authority and on-scene commanders essential flexibility in meeting mission requirements and demonstrably improve survivability in increasingly lethal environments.
- *Develop close-range, quick reaction antiair weapon systems.* Ground, naval surface, and amphibious forces will be subjected to the launch of missiles with little warning from close range. Rapid detection, identification, and engagement of these threats must be undertaken. Antiship missile defense systems and air defense artillery missiles must be equal to the task across the board.
- *Maintain amphibious assault capabilities and sufficient expeditionary forces.* Amphibious capabilities take on increased importance in MIC. These forces must be able to be employed over a wide spectrum of littoral conditions that require the unique capabilities of landing craft/air cushion (LCACs). The marines must be able to operate against a sophisticated, lethal, and vigorous enemy, requiring the tactical mobility and survivability of an improved medium lift assault helicopter or aircraft.
- C^3I *technologies may well be the key military systems of the future.* Advanced C^3I systems serve as a force multiplier, particularly in mobile warfare. Moreover, because U.S. forces are likely to be outnumbered in MIC, especially at the outset of a conflict, reliable C^3I capabilities will be crucial to success. The DOD should increase research and development of advanced C^3I technologies and techniques, though particular care must be taken to avoid rendering forces dependent upon a single centralized system that could fail. Unpiloted air vehicle capabilities should be vigorously pursued. Piloted surveillance assets will be fully utilized in MIC; both technologies must be fully integrated with firepower systems in rapidly deployable joint intelligence fusion centers.

- *The army reserve and national guard constitute an important insurance policy against changes in Europe.* As the active duty U.S. land forces are reoriented to a somewhat lighter, more strategically mobile configuration (as the army has said will occur), many of the U.S. forces committed to NATO will have to be assigned to the guard and reserve. Thus the readiness of guard and reserve units will assume increasing importance in the years ahead, and the services ought to investigate innovative programs for bolstering that readiness.
- *The ability to exploit military space capabilities* in support of battlefield and theater operations as well as an effective ASAT capability to negate hostile satellites will become more critical in future mid-intensity conflict situations. Such will be the case especially where the United States may be required to project forces in distant regions, such as the Middle East, southwest Asia, and East Asia.

A New Challenge for the Military

Mid-intensity conflict will therefore undoubtedly offer the greatest challenges the U.S. military will have to face in the decades ahead. The decline of Soviet imperial ambitions and the Soviet conventional threat to Europe represents not the end of history, but merely the conclusion of another of history's stages. The next stage, from the vantage point of the U.S. military, is likely to center around MIC.

IV
Low-Intensity Conflict

The most frequent challenge for the U.S. military will continue to be, as it has been for the past two decades, developing effective responses to the complex and diverse threats posed by low-intensity conflict (LIC). Seemingly intractable social and economic problems, widening gaps between the rich and the poor, renewed nationalism and religious fundamentalism, and global telecommunications and information transmission have provided a fertile environment for the formation of groups that feel disenfranchised by the evolving world order. Their intense frustration with their inability to influence events through established national and international political, social, and economic institutions will frequently lead to violent and destructive conflicts.

The challenge for the U.S. military is not only to maintain and improve upon responses that have proven effective against past LIC threats but to become aware of, develop, and field responses to a whole new range of increasingly sophisticated attacks that might be mounted against U.S. interests. This challenge must be met against a backdrop of shrinking budgets and competition for resources with many other federal agencies that will have roles, along with the military, in framing interagency responses in the LIC environment. Developing comprehensive and effective military responses to these LIC threats mandates that U.S. political and military leaders understand the evolving LIC environment, correct existing doctrinal and bureaucratic obstacles to LIC, and form a clear appreciation of the military's role in each of LIC's six operational areas.

The Low-Intensity Conflict Environment

Third World countries are continuing to acquire sophisticated weapons. The Soviet Union, previously regarded as the primary supplier of advanced weaponry to Third World states, is now being replaced in that role by countries such as Brazil, Israel, West Germany, South Korea, and India. The range of weapons technology encompasses nuclear weapons, chemical weapons, ballistic missile technology, sophisticated aircraft, submarines, armor, and precision guided weapons. The continuing proliferation of these arms increases the dangers inherent in defending U.S. interests abroad.

The use of U.S. military force will be the subject of intense national and international scrutiny. The American public has limited tolerance for the casualties, international condemnation, and protracted involvement (and expenditures) inherent in many LIC operations. Close media scrutiny of LIC and the increasingly sophisticated exploitation of media access to shaping public opinion by the opponents of LIC operations further intensify the difficulty of conducting LIC operations. The predictable swing of public support that accompanies U.S. military action places a premium on its rapid and successful conclusion.

The existence within the United States and elsewhere of international drug organizations will continue to present a growing threat to legitimate institutions. Just as insurgencies compete with governments for control of their populations, so too will international drug organizations challenge the developed world for control of their infrastructures such as political organizations, police, and financial institutions. Already, money from the highly profitable drug trade provides drug lords and terrorists the means to obtain state of the art communications, weapons, and training. Thus, as the United States enters the twenty-first century, the potential exists for more of its threats to come from international crime organizations. Such threats argue for a quantum improvement in interagency cooperation and coordination.

Finally, the nature of many LIC operations means that the employment of military resources is secondary to remedying the social, economic, and political factors at the root of many conflicts. As a result, military forces will frequently find themselves occupying subordinate but essential roles within a much larger interagency effort.

Doctrinal and Bureaucratic Obstacles

The LIC policy ambiguity of the 1970s and 1980s coincided with a steadily increasing LIC budget throughout the initial years of the Reagan administration. Still, the administration made little attempt to develop effective coordination among the several agencies involved in LIC in the national security establishment. The various agencies continued to be guided by different objectives focusing on differing aspects of LIC. The Central Intelligence Agency (CIA) pursued assistance to anti-Communist guerrillas fighting against Soviet proxies in the Third World, while the Department of State and the DOD concentrated on counterinsurgency and counterterrorism.

Congress made the first moves toward a unified policy for addressing LIC. After an extensive examination of the U.S. organizational approach to LIC, which Congress found to be inadequate, it mandated a series of changes in the 1986 Goldwater-Nichols Defense Reorganization Act. Among its directives were the following:

1. The creation of a unified command for special operations-U.S. Special Operations Command (USSOCOM).
2. The establishment of an assistant secretary of defense for special operations and low-intensity conflict (OASD SO-LIC).
3. The creation within the national security council of a board for low-intensity conflict (the LIC Board).
4. A recommendation to establish a deputy assistant to the president for national security affairs for LIC.

The executive branch met the letter of the law but did not implement all of its recommendations. The Unified Command was established and recently received its own budget (Major Force Program [MFP]-11 for the FY 1992–1997 budget cycle). The LIC Board at the NSC has only recently met, and neither President Reagan nor President Bush have designated a deputy assistant for LIC.

The White House is not alone in its opposition to the establishment of an oversight body for LIC. Some changes in the DOD establishment called for by Congress have been ignored. The establishment of the USSOCOM itself met with opposition from the service chiefs and various regional commanders in the

DOD. Despite the objection of the Senate Armed Services Committee, the Joint Chiefs decreed that USSOCOM be located at MacDill Air Force Base in Florida, effectively removing the command from mainstream Washington activity and leaving it with limited means to represent itself in the bureaucratic warfare that was sure to surround its establishment. USSOCOM has had to battle persistent efforts by the DOD to reduce its operating budget. Unless the approach of the DOD and the executive branch to the establishment of a unified LIC organization is changed, that opposition will continue to hamper future U.S. ability to meet the LIC challenge.

Congress, too, must share the blame for the shortcomings in the U.S. ability to address LIC challenges. Congressional micromanagement of U.S. military operations has hindered their efficiency. Congressional limitations on monetary and equipment aid have undermined the ability of the United States to assist nations engaged in conflicts. Furthermore, Congress determines where and to what extent security assistance to Third World nations is applied. Thus, decisions over funding often can be determined by the skill of the lobbyist, rather than the political-military need for assistance.

The United States requires a coherent national strategy that clearly defines U.S. national security interests and the motives for U.S. involvement in LIC in the Third World. The U.S. national security establishment is beginning to realize that LIC is a constant element in today's world. The 1987, 1988, and 1990 versions of the president's *National Security Strategy of the United States* reflect the growing understanding that low-intensity conflict presents a clear and present challenge to the United States. That understanding, however, has yet to be translated into institutional responsiveness or a real change in the doctrinal or operational way in which the government responds to LIC threats.

The U.S. approach to LIC is hampered by the lack of a coherent doctrine. Army Field Manual (FM) 100-5 *Operations* outlines doctrine for conventional ground combat. For air warfare doctrine, Air Force Manual 1-1 *Basic AeroSpace Doctrine* governs. Similarly, naval doctrine is promulgated in official publications. But the process of establishing a coherent LIC doctrine has met with opposition from a military establishment reluctant to address the nature of the LIC threat.

A comprehensive LIC doctrine requires a blend of diplomatic, developmental, intelligence, law enforcement, and informational measures coupled with military means. But it has taken eight years for the DOD to produce just a draft doctrinal statement (Joint Chiefs of Staff Publication [JCS Pub] 3-07), and even that will not be finalized until 1992. By then, no doubt, it will be out of date. Moreover, taking an integrative approach toward bringing many of the nonmilitary resources to bear on LIC situations—including economic development, counterguerrilla operations, civic action, civil defense, and air support for LIC—is unlikely to occur.

Low-Intensity Conflict Operational Structures

In 2002, the U.S. military may become involved in any one of the six major LIC operational areas: peacetime contingency operations, peacekeeping operations, combating terrorism, counternarcotics operations, counterinsurgency, and insurgency. Each of these LIC operational areas has unique requirements and priorities. Ideally, the United States should prepare to respond effectively to all LIC challenges across a broad regional spectrum. Declining resources, however, will require that political and military leaders establish priorities both among and within the six major operational areas.

1. *Peacetime Contingency Operations.* Contingency operations have been and will continue to be the most common form of LIC for U.S. military forces. As such, they should constitute the highest priority for U.S. military forces. Occurring in an environment characterized by instability, uncertainty, intense media interest, minimal planning time, and a rapidly changing crisis situation, forces structured for peacetime contingency operations require high levels of readiness, balance, flexibility, air-ground-logistics integration, rapid responsiveness without reliance on reserve integration, and a credible forcible entry capability. The declining number of U.S. bases overseas, increased threats from short- and medium-range ballistic missiles, and the need to establish and sustain a credible potential force in crisis areas portend that maritime and light ground forces will continue to be, as they have been,

the most acceptable form of military presence and crisis response. Surface carrier battle forces and ready amphibious groups possessing high degrees of tactical mobility will be needed as essential components of a balanced U.S. force structure, as will light infantry, long-range strike aircraft, special operations capable forces, and airborne forces.

2. *Peacekeeping Operations.* As a new world order evolves from the break-up of the Soviet empire, peacekeeping operations may assume a significantly greater portion of the U.S. military's effort. The relatively high-ranking personnel and sophisticated communications and surveillance capabilities that will be necessary to support the Conventional Forces in Europe treaty will constitute a fairly significant peacekeeping effort. Further, the dynamic engendered by national and ethnic groups willing to fight to realize their aspirations, coupled with an international desire to constrain conflicts arising from those aspirations, increases the likelihood that the U.S. military will find itself participating in a variety of bilateral and multilateral peacekeeping operations throughout the Third World, perhaps even in Eastern Europe. Trained observers, linguists, foreign area specialists, and communications and surveillance equipment should be given high priorities.
3. *Combating Terrorism.* Terrorism will continue to pose a significant threat to U.S. lives and interests, both at home and abroad. The proliferation of sophisticated weapons and weapons of mass destruction combined with relatively open borders and frequent international travel means that U.S. citizens and facilities could be attacked with weapons as diverse as lethal chemicals, shoulder-fired surface-to-air missiles, or lasers. As a result, imaginative and aggressive offensive (counterterrorism) and defensive (antiterrorism) measures must be assigned a high priority. Within this category, the most significant shortfall continues to be human intelligence; it must receive higher priority. Both counterterrorist training and the development of command and control systems to support counterterrorism operations have significantly improved in the past decade. These efforts should continue.

4. *Counternarcotics Operations.* Recent opinion polls make it clear that the American public believes that the supply and use of illegal drugs is an important national security challenge. The U.S. military role in the drug war is increasing and will continue to do so for the near term. By 2002, however, it is likely that current efforts will have reached the limits of their potential in controlling narcotics traffic. Within this category, U.S. Coast Guard force structure, surveillance, and command and control technologies should receive the highest priority.
5. *Counterinsurgency Operations.* Because of the need for a long-term commitment and significant effort, the probability of supporting a less-than-perfect regime, and the potential for failure associated with U.S. counterinsurgency operations, the American people and the Congress are reluctant to become involved in these operations. Nonetheless, future administrations, like past administrations, may find that the lesser of two evils requires U.S. involvement. The United States, as the world's only democratic superpower, must develop the capability to win a counterinsurgency campaign. This will require winning the interagency battles at home.

   Moreover, counterinsurgency requires greater priority for training. Unlike some LIC operations, the training of counterinsurgency forces must be especially thorough if their actions (e.g., excessive firepower and collateral damage) are not to damage the overall operations. In particular, U.S. military personnel assigned to perform advisory functions must speak the local language, understand the local culture, and be able to function as an effective and reliable link between the government they are assisting and the U.S. advisers.

   U.S. military forces for LIC in the twenty-first century will need to focus much of their efforts on nation building. In this regard, the primary role for the military will be to complement the lead of other agencies of the U.S. government. Finally, the security assistance program is the linchpin of the U.S. military counterinsurgency effort; its reform and consistent financial support deserve high priority.

6. *Insurgency Operations.* With the CIA's assumption of responsibility for U.S. support of insurgencies, U.S. military forces are essentially reduced to the role of supporting interagency actions. As with much of the rest of LIC, the key priority in this category is improving interagency cooperation and coordination.

Although special operations forces (SOF), by design, have the area orientation, language qualification, and skills to operate in the highly visible LIC environment, it is important to note that they are not solely a LIC force, but a force designed to operate across the spectrum of conflict. The LIC will also have to continue to participate with other agencies in whatever programs are taken by the supported government to free and protect its society from subversion, lawlessness, and insurgency. The LIC community will not only need to continue to use the expertise of its special forces and ranger units in the future but also to complement their employment with more psychological operations, civil affairs, medical, and engineering personnel. Although there is a 50-50 split between active and reserve components in the special forces units in the current force structure, there is a significant imbalance when it comes to Psychological Operations (PSYOP) and Civil Affairs units. Although 98 percent of the DOD PSYOP and 95 percent of the Civil Affairs capabilities are in the army, up to 90 percent of this force structure is in the army reserves. The United States must find a mechanism to make these types of forces more responsive to support future operations.

All conventional forces are inherently and doctrinally employable in LIC. As we escalate from peacetime intervention through the far end of the spectrum of LIC, conventional forces from all services, including the U.S. Coast Guard, will increasingly be required to play a more direct role in LIC. In the next century most, if not all, LIC activities will need to be conducted as joint operations.

Doctrine and Force Structure Recommendations

- *Strategy to Guide U.S. Involvement in LIC.* The future role and mission of the U.S. military will necessitate the formulation of a national strategy for the involvement of military forces in LIC. The diverse and complex nature of LIC requires that this strategy clearly define U.S. national interests in the Third World and the necessary means for safeguarding those interests against likely threats.
- *Inter-Agency Cooperation.* In all LIC, and particularly in counterinsurgency and counternarcotics operations, better interagency coordination is essential. No effective process currently exists to coordinate these military actions. Such coordination must be accomplished by the deputy assistant to the president for LIC and vigorously executed by the LIC Board.
- *Civil Affairs/Nation Building.* Civil Affairs operations, primarily involving nation building, are conducted by specialized Civil Affairs units as well as specialized PSYOP units within the U.S. military. Currently, the United States possesses only a single active duty Civil Affairs battalion and three reserve Civil Affairs commands. A single active duty PSYOP group exists, while there are three PSYOP groups in the reserve component. This current force posture is inadequate, as it requires the calling up of reserve Civil Affairs units in all but the most limited LIC operations. Although the current structure does provide a carapace for the introduction of civilian and other military assets, it remains very limited and may prove to be a serious shortcoming in a sustained effort in which reserve units are called up for some time.

  In recognition of the sociopolitical issues that foment instability and insurgency, the primary area of emphasis for U.S. forces involved in counterinsurgency operations must be nation-building efforts. Civil Affairs operations involve the provision of humanitarian and civic assistance to the people of the host nation. Specific programs include provision of medical, dental, and veterinary care; improvement of the internal transportation system; the drilling of wells and construction of basic sanitary

facilities, as well as the improvement of basic public facilities and education programs.

The current posture of U.S. military Civil Affairs and PSYOP units is not conducive to an effective nation-building strategy in LIC. Clearly, more Civil Affairs and PSYOP assets should be placed in the active duty force structure. U.S. Special Operations Forces are well trained for Civil Affairs operations. These forces should be utilized as the primary reaction force in the case of counterinsurgency, counternarcotics, and some peacetime contingency operations.

- *Civil Defense Forces.* The U.S. military doctrine and strategy for counterinsurgency warfare puts insufficient emphasis on local-level civil defense forces. Greater emphasis on the establishment and provision of civil defense forces should become a key element in U.S. counterinsurgency strategy.

  The equipping, training, and organization of local civilian defense forces at the village and provincial level for provisional defense is a key component of counterinsurgency strategy, as has been proven in numerous counterinsurgency operations. Civil defense is an essential method of involving the populace in the conflict on the side of the supported government. The formation of civil defense forces requires the application of appropriate weaponry and military technologies in adequate numbers. This area is often neglected in U.S. counterinsurgency efforts. The United States possesses limited experience in the training of civil defense forces, and insufficient attention has been paid to the formation of doctrine in this field.

- *Security Assistance Program.* The U.S. security assistance program needs to be improved to demonstrate positive results and to earn the political and popular support needed to acquire increased funding. The current program must be reviewed to establish the mechanism for improved performance. This program is constrained to provide only major items, ammunition, and military supplies to the host country, even if those specific items are not needed.

  The restructuring of the U.S. security assistance program should include granting greater authority to the president for allocating funds to those countries that U.S. strategy indicates require such priority. The security

assistance program should cease being a source of funding for only a few nations and peoples and instead should be directed to those countries deemed in need by an analytic method based on threat, requirement, and potential benefit.

U.S. security assistance programs require two additional changes: (1) A relaxation in procurement procedures to allow flexibility in obtaining nonstandard items that are appropriate for the local situation and (2) the professional development and career progression of officers and noncommissioned officers (NCOs) to develop, manage, and implement security assistance programs worldwide. Personnel trained and professionally developed as experts in LIC should be included.

- *Appropriate Technology.* Expendability, low maintenance, and low cost should be the guiding factors for the provision of military equipment to Third World forces. The country team should also possess the flexibility to purchase non-U.S. items to equip the host nation's armed forces. Appropriate technologies can enhance the ability of the United States to achieve its foreign policy goals and minimize the threat to U.S. personnel. Appropriate technologies may also serve to minimize the U.S. presence in the host country.
- *Watch List for Surge Assistance.* A watch list should be developed of countries vital to U.S. security interests and qualified to receive special consideration. This list should be the result of a consultative process between the executive and the legislative branches, and it would spell out needed surge assistance capabilities. In the event of a crisis in a specific country, this surge capability would provide that country with at least a short-term ability to address a threat.
- *Improved* HUMINT *and* SIGINT *capabilities.* Needed human intelligence (HUMINT) capabilities include linguists, a reporting structure (to include a counterintelligence [CI] network), interrogators, liaison personnel, observers, and patrols. The elements of signal intelligence (SIGINT) include radio intercept, space-, air-, sea-, and land-based surveillance and surveillance equipment such as radars, cameras, and sensors (magnetic, infrared, and acoustic).

Effective PSYOP operations should also make use of the local media.

Effective intelligence operations require competent trainers to teach basic intelligence processing, order of battle, interrogation, and simple intelligence trade craft, such as a clandestine communications network to the host nation security forces.

- *Intelligence Fusion.* A basic intelligence fusion structure to meet both U.S. and allied needs for LIC operations must be developed. It would provide automated collection, assessment, analysis, distribution, and aggregation of intelligence data. Present LIC intelligence fusion falls short of the capabilities of other conventional forces. Tactical-level LIC operations are currently hampered by too much information. In the future, as new capabilities grow, LIC forces will be overwhelmed by data that cannot be systematically correlated, assessed, displayed, and distributed.

Technology Recomendations

New capabilities are needed for future low-intensity conflict operations. Technologies that might provide needed capabilities include

- *Proliferation of effective affordable all-weather night vision* equipment for U.S. allies and of better, lighter night vision equipment with peripheral vision and depth perception for U.S. forces.
- *Remotely piloted vehicles* (RPVs) *with low radar cross section and low noise output* for intelligence collection when higher priority, more expensive satellite systems are not available. RPVs are also needed to operate as weapons platforms, mine dispensers, leaflet dispensers, loudspeaker carriers, and deception devices over hostile territory.
- A *global positioning system* (GPS) *receiver* with a lighter, less cumbersome backpack, backed up with a 24-hour satellite capability.
- *Unattended ground sensors* that are low cost and can be dropped from the air.

- *Surveillance systems* to penetrate woods, jungles, and urban cover to find hidden and camouflaged targets and mines.
- *Remotely controlled countermine equipment* that moves ahead of the operator.
- A C-17 with the capability both for air-drop operations and air landing operations using short runways.
- *Short takeoff and landing* (STOL) *light aircraft.*
- *Helicopters with high-altitude environment capabilities* with an above 13,000-foot aerial refuel capability and navigational forward-looking infrared (FLIR) systems on board.
- *Secure communications equipment* that is low cost, compatible, interoperable, mobile, and easy to operate.
- *Miniaturized squad radios* with a low probability of intercept and a low probability of detection.
- *Thermal weapons sights* for longer-range and crew-served weapons and for close range individual weapons.
- *Lightweight body armor.*
- *Accurate ground maps,* quickly producible perhaps via two-dimensional LANDSAT data to give a three-dimensional all-aspect view of an area.
- *Computer simulation capabilities for training.*

V

High-Intensity Conflict

High-intensity conflict is conventional (non-nuclear) war of such large scope and importance that the United States could not afford to lose it nor allow it to escalate. The next step would be nuclear. It is a war that requires an assumption of virtually indefinite sustainability—a conflict in which a totally committed citizenry devotes unconstrained national resources to achieve unlimited military objectives.

Because of the nature of such a conflict, force levels available in 2002 could be so constrained that a decision would have to be made for a long-term buildup (of three to five years) as a preliminary step before the United States could return to a military strategy that included the option to wage high-intensity conflict.

In effect, U.S. leaders will be grappling with a situation quite opposite to that of the last several decades. Until now, the United States has maintained a high level of military forces and capabilities focused principally on NATO and, by doing so, has assumed that all other lesser conflicts that might develop could be satisfactorily handled by tailoring forces designed for Western Europe. As the Soviet/Warsaw Pact threat continues to diminish, however, by the turn of the century the United States will have a much smaller standing military, designed only to respond to medium- and low-intensity conflicts. Yet that reduced military must maintain the capability to expand to become a massive armed force able to prosecute high-intensity conflict.

Maintaining this capability requires the projection of conventional forces into areas having no, or very little, pre-positioned forces or supplies. It means maintaining a capability for rapid

response to well-trained opponents with relatively high technology weapons and engaging those forces for a protracted period. A U.S. conventional force structured to such requirements would also be necessary in Europe as arms control agreements and the recent events in Eastern Europe lead to a drastic reduction of U.S. and allied forces on the Continent. Both the loss of overseas bases and the demobilization of U.S.-based forces will seriously affect the U.S. force structure. The United States must maintain the capability to deploy firepower and forces rapidly.

These general considerations can be reduced to three major operational capabilities needed for high-intensity conventional combat in 2002:

- *Force Projection*: the ability to project power on a global scale any place it is needed at any time;
- *Early Firepower*: the ability to bring the non-nuclear firepower necessary to deter, contain, or end the conflict in its early stages; and
- *Sustained Combat*: the ability to sustain a combat force as long as it is needed to achieve the military objectives and hence meet national strategy and policy goals.

Force Projection

Projection of forces will become the common denominator in any type of future conflict. Mobilizing and deploying forces will be essential elements of U.S. strategy. Other than in Europe or on the Korean peninsula, the United States must have the ability to insert forces into areas that lack an adequate infrastructure to support them.

The ability of the United States to project these forces will, of course, be challenged; U.S. forces must be combat effective upon entry into a hostile environment. Sea transport will be the primary means of large-scale deployment, and U.S. forces must have the ability to sustain themselves from the port to the forward battle area.

In some circumstances space control may be a prerequisite for sea control. Soviet space control or a lack of a U.S. ASAT capability would enable the Soviets to regain conventional superiority at an operational level, a superiority that might have otherwise been reduced or eliminated by a conventional arms control agreement.

Space control will also be critical to the U.S. ability to execute efficient deep strikes into enemy territory with precision non-nuclear weapons in conflicts of longer duration. Control of space by the Soviet Union could deny the United States many advantages that might otherwise accrue from U.S. technological superiority in conventional weapons.

Space control may be critical to the U.S. ability to conduct maritime and naval operations efficiently over great distances, especially in conflicts of long duration. Lack of a U.S. ASAT capability or a permitted sanctuary for hostile space systems (Soviet or others) would permit a much more efficient interdiction campaign against U.S. and allied sea lines of communications.

The lack of U.S. capability to control space would also substantially increase the dangers of satellite and ASAT proliferation in a multipolar security environment. A Soviet capability to control space in an environment of satellite and ASAT proliferation would be especially disadvantageous to the United States in a future multipolar high-intensity conflict.

Early Firepower

The U.S. forces projected into a combat zone must be able to interdict immediately and delay enemy forces. They must prepare for the interjection of follow-on forces. Firepower must be furnished by carrier-based support aircraft, by strategic bombers used in a conventional role, by offshore bombardment from ship-based guns, from cruise missiles launched from sea-based platforms, from long-range land-based missiles, or from unpiloted or remote-controlled aerial vehicles launched from ships or ground sites secured in the immediate beachhead or airhead area. U.S. forces must have sufficient firepower to resolve the issue before nuclear weapons are used.

Combat Sustainment

The force must be able to seize and hold ground facilities on its own and support itself by drawing from indigenous sources of

supply. It must be capable of the destruction of enemy forces on a prolonged basis.

Rapid response and global power projection will require maintaining a large inventory of air-, land-, and sea-launched smart weapons. Industry, in the future, will not be able to respond quickly and on short notice with technically sophisticated weapons as it has responded in the past with unsophisticated weapons. Thus for those sophisticated, or long-lead, weapons deemed necessary to future U.S. force structure and national strategy, the United States will need to keep industry ready by funding a continuing level of production capacity that could be increased on short notice.

High-Intensity Logistics

In 2002, the conventional combat needs for high-intensity conventional combat for force projection and early firepower will not be much different than those needed for mid-intensity conflict. The crucial difference for force structure, doctrine, and technology policies is that the logistical support required for HIC will be orders of magnitude greater than the present system is capable of providing.

In World War II, a high-intensity force of about one corps with accompanying air support would have consumed about 1,500 short tons (STON) of supply daily, mainly in ammunition and fuel. In high-intensity conventional combat in 2002, consumption rates will be five times that rate, and surge rates will be required to reach 12–15 times that level, still mainly in ammunition and in fuel. Substantially higher consumption of repair parts will be necessary for dealing with the greater loads of battle damage that the modern and costly main items of combat equipment will require even though they will have improved operating hours per maintenance hour.

Although bringing 7,500 daily STON into a theater port is not tremendous for a large peacetime commercial port operation, it is a staggering amount to put into an airhead or a combat port facility. A surge rate of 20,000 STON is also alarming in terms of both movement to supply points and the sites needed to store and preserve such theater-level inventories.

In the environment anticipated, on-shore dumps at known locations, seaports, and runway complexes capable of handling up to 2,000 takeoffs and landings per day, all present big fixed targets that are likely to be under continuous attack by enemy air with such weapons as air-to-surface missiles (ASM), surface-to-surface missiles (SSM), and ground-launched cruise missiles (GLCM) utilizing sophisticated penetrator, "cluster," mine, and fuel-air-explosive payloads. The resupply systems must be defended against all of this.

A different approach will be necessary for theater resupply. Large surface effect ships of 1,000–2,000 STON capacity with self-defense armament could load farther off shore, perhaps from larger ships of 20,000–40,000 tons displacement. The speed and flexibility of such ships would totally redefine theater logistics as to routes, timing, echelons of stockage, required supply quantities, and vulnerability to enemy capabilities. The problem is that the defense acquisition system is unlikely to develop these kinds of ships by 2002 even if the enormous R&D effort and procurement costs to do so could be absorbed in the diminishing defense budget.

A major issue is that of the widespread use of cheaper unguided ordnance, rather than expensive guided munitions. In the above context, the costs of stockage, movement, and projection of ammunition within and to the theater are not low. Unguided ordnance can be justified only when the combat effect sought is prolonged neutralization, harassment, or reconnaissance by fire, because one cannot confirm and find or hurt the targets. When air ordnance is considered, the additional issues of productivity, aircrew survival and rest, and aircraft exposure to battle damage are further concerns. Because smart weapons have a history of not performing as well in combat as intended in design, one must always keep in mind that more—probably many more—smart weapons will be needed than were planned.

A final concern of service support is the limitation of naval combatant ships in numbers, magazine storage, and fuel tanks and the train of underway replenishment groups available for sustaining sea combat operations. Naval gunfire is required to support amphibious combat and to commandeer uncooperative merchant ships and off-shore oil platforms; unguided weapons—projectiles and bombs—take up a great measure of space and weight. A large force of combatants and support ships is thus required to limit replenishment and increase the on-line/on-station time.

The answer is to push the burden of the antiarmor killing upward through the echelons, to greatly reduce the exposure of humans and vulnerable material to enemy weapon effects. Remote-controlled ground vehicle and autonomous standoff concept missile systems are obvious choices, but these are very expensive and have never been procured in the quantities required by service inventory objectives. Thus a mix of smart and dumb ordnance will remain a fact of life to 2002 and beyond.

Implications

The implications of this future scenario are that the United States must

- tailor U.S. forces so that the capabilities that take the longest to achieve after the beginning of hostilities receive higher priorities than those that can be quickly developed.
- emphasize research, development, and production over high numbers of active duty forces.
- keep a fraction of units in a high state of readiness and the others in a much lower capability posture.
- rely more on reserve forces.
- possess a rapid mobilization capability.
- provide for increased airlift and sealift capacity.
- maintain highly qualified cadres ready to convert recruits into ready forces.
- maintain a corps of commissioned and noncommissioned officers that is highly educated in strategy and tactics, flexible enough to tailor U.S. forces to changing world conditions, and perceptive enough to recognize the evolving nature of warfare.

By the year 2002 these qualities will be as difficult to apply to Europe as they are today to apply to southwest Asia.

High-Intensity Conflict in Europe

The political and strategic requirements of conventional forces in Europe are undergoing a profound transformation. By the mid-1990s, U.S. ground-based forces in Europe will no longer be there to

form a robust war-fighting capability to deter a Soviet conventional attack. Rather, those forces will serve other purposes. First, they will have to form the structure upon which U.S.-based forces could be returned to Europe against a resurgent Soviet Union. Second, they will play a role in stabilizing the central European situation during a time of potential instability. Finally, they will serve as a unifying element for maintaining NATO cohesion for a period in which intra-alliance pressures could emerge to disrupt the transatlantic unity of the alliance. The force structure, doctrine, and technology requirements for such a force are obviously different than those for previous NATO conventional forces.

At the same time, conventional forces will of course also be constrained by the requirements of CFE treaties and measures introduced into the conventional force equation by other processes such as the Conference on Security and Cooperation in Europe (CSCE). These processes could advance incrementally as anticipated by the Bush administration—or the process could accelerate beyond the control of the superpowers or the two alliances. In the former case, U.S. and Soviet force levels would stabilize somewhere near the present agreed troop levels of 195,000 each—perhaps going to lower levels of around 150,000 each—in the central region. In the latter case, both U.S. and Soviet forces might be invited to leave the central region or portions thereof. Should this happen, U.S. and Soviet forces could decline to the 30,000 level for the peripheral regions of the Atlantic-to-the-Urals zone. In between these two extremes there are an infinite number of permutations and combinations, but an examination of the extremes provides an idea of the kinds of force structures, doctrines, and technologies likely to exist in Europe by the next century. The relevant issue then is how the United States would contribute to the defense of Europe with conventional forces.

Likely Force Levels

Obviously, the present U.S. force level of 326,000 troops in all of Europe will shrink dramatically over the next few years. Current U.S. combat formations organized into two corps and four tactical fighter wings will not be the same in 1995 as they were in 1985. To get from the present levels to the limitations

on troops and equipment of the CFE agreement will require the United States to cut its combat and combat support strength in half to maintain a sizable slice of the service support infrastructure needed for the reintroduction of forces in the future should it prove necessary. Thus, a requirement to reduce the total deployed force by 40 percent (from 326,000 to 195,000) will result in a disproportionate reduction in combat power to preserve the potential to bring additional combat power into the theater at a later date.

Current U.S. military plans call for achieving this by removing two full divisions, two corps artillery brigades, one corps headquarters, and two fighter wings. A robust reconnaissance, engineering, and air defense force structure would remain, as would a significant theater area support base. These plans reflect the expectation that the residual force would continue to plan to fight a European war in the same manner as it currently does. The difference would be that greater warning time would be available under a CFE regime that would allow reintroduction of former force levels as well as of other traditional reinforcing forces from the continental United States.

This would require NATO, at a minimum, to redraw the boundaries of corps sectors in the central region, perhaps also to account for reductions likely to occur in other national corps forces, such as the Belgian and Dutch corps. But after these basic rearrangements are in place, it will be clear that the entire operational approach to conventional defense in central Europe will have to change. New forms of forward defense will have to emerge.

Forms of the Defense

There are essentially four basic forms of the defense that NATO forces will consider: area, linear, mobile, and aggressive. At the same time the alliance walks through the process of drafting a new strategic doctrine document (MC-14/4), the national fighting forces, the Supreme Allied Commander Europe (SACEUR) and the Military Committee also will walk through an operational level reconsideration of the form of defense to be applied by the fighting forces that constitute the NATO integrated military structure.

Area defense is defense in depth. The defender disperses its forces into numerous small unit concentrations in an attempt to be nearly everywhere in at least some strength to meet the enemy force wherever it may strike. Once deeply enmeshed within the defensive network, the attacker is gradually worn down by small unit hit-and-run tactics, sometimes in the form of guerrilla warfare and sometimes by means of large-scale counterattacks, which keep the attacker off balance. Although an initial penetration of the defense may be achieved, eventually the attacker must withdraw or risk being defeated by a process of attrition. The Finnish defense against the Soviet attack of 1939–1940 is generally regarded as an example of successful area defense against a superior force.

The *mobile defense* concept was developed to counter the World War II German blitzkrieg concept. The defensive zone is divided into three sectors: covering force, main battle, and rear area. In the covering force, highly mobile, lightly armored forces are thinly deployed across the entire defensive front to make initial contact with the attacker. As the attack develops, the covering force tries to make the enemy concentrate its armored spearhead into corridors preselected and extensively prepared in advance by the defender. The covering force then fights a delaying action in front of the enemy, falling back until the enemy reaches the main defensive area. In the main battle area, the bulk of the defensive force has prepared strong positions to block and defeat the attack. If the main battle area is penetrated, large mobile armored reserves are called up from the rear area to meet the penetration. Once the attacker can no longer advance, the defender rapidly mounts a counterattack to cut off and destroy the enemy or to force it to withdraw from the main defense area. Until the late 1970s, variants of the mobile defense formed the principal operational concept employed by NATO forces in the central region.

In a *linear defense,* the defender constructs a wall along a line that the attacking enemy is not permitted to cross. The line is fortified and covered by massed firepower to annihilate any attacker who might attempt to break through the line. Behind the fortified wall the defender positions a few mobile reserves at key locations to stop any temporary breaches of the line. The French Maginot Line was a classic attempt at linear defense. It should be recalled that the much-maligned Maginot Line was not penetrated when the Germans attacked in May 1940; it was bypassed.

Finally, there is an *aggressive form of the defense* in which the defender attempts to seize the initiative early, without employing any of the three other forms of defense as the primary mission of the bulk of its forces. Aggressive defense is rooted in the belief that the best defense is a good offense. The Israeli preemptive attack in the 1967 war is an extreme example of aggressive defense, but there are less drastic forms. NATO's follow-on forces attack (FOFA) concept and the U.S. AirLand Battle are current examples of the aggressive form of the defense.

The Operational Form of NATO Conventional Defense

The United States will probably attempt to continue to adapt its forces in the future to the aggressive form of the defense as embodied in the emerging concepts of AirLand Battle Future and Nonlinear Battle. Currently in various stages of draft formulation, the U.S. doctrinal concept for the future envisions a highly fluid battlefield in which there is not likely to be a discernible front line. Battle will occur throughout the depth of the area of operational interest and influence. The depth and width of the battlefield that can be affected by operational level commanders will expand in the 1990s as new systems come into being.

The U.S. Army is counting on the availability of deep strike systems such as the Army Tactical Missile System (ATACMS) to give corps commanders the ability to strike enemy formations over a 100 kilometers away. This capability will be highly dependent on sophisticated reconnaissance, surveillance, and target acquisition systems, especially the Joint Surveillance, Targeting, and Reconnaissance System (JSTARS), for maximum utility on the battlefield. Tactical air forces are planning on employing the stealthy, night-capable, all-weather attack capabilities of the F-117 stealth fighter and the advanced tactical aircraft (ATA) to provide a superior ability to interdict deep targets.

There are, however, a growing number of signs that those kinds of programs will be under increasing jeopardy in the next few years as the U.S. Congress expects to reap a "peace dividend" from the reduced tensions between the United States and the Soviet Union. The ATACMS program has experienced some

success in recent developmental tests and appears to be on schedule, but it is doubtful that sufficient funds will be available to produce and stockpile the quantities that would be required for effective conventional defenses for the future. The JSTARS program has encountered technical and bureaucratic delay that not only will prevent its deployment until at least 1997, but also will make it a lucrative target of opportunity for budget cutters expecting to save money by terminating problem programs and freeing up funds for other projects. The ATA program has survived the comprehensive internal Defense Department review of major aircraft programs, but has become a favorite quarry of numerous factions who hope to make major defense cutbacks to benefit domestic (or other defense) programs.

Finally, none of the sophisticated targeting and strike systems will be operationally effective in the defense of Europe if they are not integrated into a comprehensive theaterwide battle management framework. Real-time information on friendly force dispositions as well as intelligence on enemy capabilities and intentions will have to be available throughout the operational and tactical levels of NATO forces in the central region if these systems are to be brought to bear on the critical attacking formations and not distracted by forces not crucial to the outcome of the battle. Although there is a proliferation of such battle management/C^3I projects in both the U.S. and European forces, there is no attempt to integrate these systems throughout the theater into a comprehensive structure to achieve synergy in battle management functions.

But U.S. plans may also run into difficulties as they conflict with geopolitical trends within the alliance. Aggressive forms of defense have never been fully accepted by the European members of NATO although all assent to the SACEUR's doctrine of FOFA. But in the emerging security environment in Europe, aggressive defenses may not be politically palatable if they call for attacks into newly democratic East European countries. Mobile and area defenses may become the required concepts for fighting forces in the NATO central region of the future. That will result in new kinds of force dispositions in Europe to replace the traditional "layer cake" approach of national corps defensive sectors.

If the current CFE process is overtaken by the pace of unilateral reductions in forces in Europe, reliance on mobile and area defenses will be even more likely. If the Soviets are completely out of Eastern Europe, then the United States might be invited

to keep no more than the 30,000 troops outside the periphery of the Atlantic-to-the-Urals zone and none in the central region. More probable would be a total withdrawal of Soviet forces with the United States being invited to maintain some minimal force level in the western half of the new Germany. That level would perhaps be around 50,000 troops. Such an outcome would demand a radically different force structure.

This kind of U.S. conventional presence could accomplish only two functions. First, it could provide a theater logistics infrastructure for the reintroduction of U.S. forces. If this becomes the case, then the U.S. force structure in Europe would look much like the U.S. force structure in South Korea and would involve mostly combat service support units, such as transportation, petroleum supply, depot inventory points for various classes of supply, prepositioned overseas matériel configured to unit sets (POMCUS) and maintenance sites, and a theater command and control infrastructure. Active combat forces would most likely be on the order of a brigade or division and would be relegated to reconnaissance and training activities. Such units would probably not need to be heavily armored or mechanized. The new roles and missions would call for new structures suited to the new era, such as light cavalry or motorized infantry. Supporting air and naval forces would be based outside of Germany perhaps in the United Kingdom or Italy and the adjacent seas.

Regardless of the final form that the conventional defense of Europe takes, it will clearly be dramatically different from what it is today. The conjunction of geopolitical changes, intra-alliance considerations, and emerging technological developments will bring a new era in the conventional defense of central Europe.

Policy Recommendations

VI
Technology

Technology is applied science. Military technology is applied military science. Military technology in the United States is prescribed by the American national style of war, typified by several basic trends.

Long a child of the Napoleonic military heritage—through the Swiss-born Jomini, the Prussian Clausewitz, and many homegrown strategists—the U.S. military system calls for a mass conscript military force in time of emergency so that enemy forces could be destroyed largely with overwhelming numbers.

The systems and processes of the industrial revolution have reinforced our convictions about large conscript masses and the nation in arms and have provided the material means for the ultimate victory—unconditional surrender. The post-World War II development of Soviet conventional military power has created circumstances in which it appears highly unlikely that the United States will ever again prevail by force of arms alone in a confrontation with the Soviets or any other potential opponent.

The character of modern conventional battle unveiled by the Arab-Israeli wars—and confirmed by the conventional combat experiences of the 1980s—clearly suggests that winning early battles, while containing losses to reasonable levels, is essential. Adequate means and time are not likely to be available to support deployments of reinforcements in sufficient strength in time to overcome potential losses in early battles, particularly if surprise is an operative element.

Unless a serious attempt is made today to establish clear priorities for technology and to make fundamental changes in

the way technology is brought to bear on military needs, conventional combat in 2002 will be dominated by critical technological weaknesses.

In addition, the Soviets have exported an impressive array of modern military gear to a substantial number of clients. They can be expected to continue to do so even after restructuring their economy and are likely to expand their penetration of world arms export markets with ever more sophisticated technologies as economic restructuring drives them to seek hard currency. Depending on the set of systems in question, the Soviets are modernizing their conventional forces at a rate of some four, five, or six to one over other contenders.

The number of suppliers of military systems with advanced technology in the global weapons trade has dramatically expanded as well, as new exporters—including China, Brazil, and Japan and the traditional European providers—seek new business. The impact of these market trends in the aggregate is that dealing with Third World contingencies will require a force with substantially more combat capability than that possessed by current U.S. light forces.

In each of the critical elements set forth above, technology offers solutions. Finding the means to hold a quantitative advantage over the threats faced in the year 2002 is highly unlikely. We must therefore seek solutions in superior operational concepts enabled by our technology. The challenge to U.S. technology is several fold.

The goal of technology cannot be simply to enable us to meet the enemy on equal qualitative terms or to make up for quantitative disparities. History testifies to the bankruptcy of those ideas. Rather, the role of technology must be to provide weapons systems that render ineffective the costly investments by our foes and not simply to match something they have just fielded.

With new weapons we should seek new dimensions of combat; following well-thought-out operational concepts with carefully designed organizations and with precisely tailored support concepts. Technology should seek to make battle outcome less calculable, not more. Instead of restoring some balance to a neat firepower equation score, we should introduce new imponderables into the traditional calculus of battle.

New technologies can enable the U.S. fighting spirit—characterized by independence of thought, rapidity of execution and violence, and flexibility of response to changing or uncertain

situations—to overcome the inherent obsolescence of the traditional American way of war. If we choose our priorities wisely and fix the defense acquisition system, then in 2002 no longer will we be dependent on outdated and unworkable principles of mobilization of mass forces for an emergency. Failing to prioritize the investment in military technology and continuing to muddle along with 12-year acquisition cycles will make the U.S. conventional military forces largely irrelevant and virtually useless by 2002.

Available Technologies

The conventional forces in service in the year 2002 will be determined primarily by technologies that are now or will soon be available. To the extent the sources of technology are innovative, significant capabilities could be available—constituting a technology push—for the transfer and application to military systems.

On the other hand, military operational needs will influence technology mechanisms, as a market pull to the kinds and degrees of technologies to be matured. This dynamic of technology push and market pull—tempered by judgments of technology risks and development or ownership costs—will shape the systems available to conventional forces in 2002. And dominating all of this dynamism of technology is the acquisition system that determines the success and timing of converting technology into fielded systems.

In response to the Fiscal Year 1989 National Defense Authorization Act, the Department of Defense submitted the revised version of the first annual *Critical Technologies Plan* in May 1989. The act required identifying at least 20 technologies necessary to develop to ensure the long-term qualitative superiority of U.S. weapons systems. The 1989 plan submitted by the Department of Defense listed 22 such technologies, called for a balanced science and technology investment strategy, and offered a net assessment of the U.S. technological lead (or lag) in each area. The 1990 submission gives an update of the list with some different categories of technology and a prioritization framework.

Because of its source and use, the DOD list provides a baseline of the critical technologies available for exploring conventional combat technologies for 2002. Of course, other lists exist, but this one appears to capture the critical emerging technologies of interest. And they are of interest only in their applicability to solving real military problems.

But the critical technologies plan is flawed because it does not hold the applications up to a rigorous standard of meeting a real military need. Instead, the plan merely applies the critical technologies to existing ideas about weapons systems, platforms, information systems, and support. The critical technologies thus are "critical" not because the capability they would provide would meet an important combat need, but only because they are required for the development of new technologies themselves. In that sense the plan is nothing more than a tautological scheme to support the current investment priorities.

An approach is needed that identifies and prioritizes the combat needs, explores trade-offs among doctrinal, organizational, and technological solutions to meet those needs, and then seeks the application of science to develop capabilities to perform those combat functions in the most cost-effective manner. Instead, the defense acquisition process begins by establishing rigid requirements that must be met by weapons systems with clearly measurable performance standards that may not be related to real combat needs. This should not be. Every laboratory experiment, every developmental program, and every acquisition strategy should have as its mission statement the meeting of a real combat need, not the achievement of a given performance requirement. If meeting a real combat need cannot be conceptualized—and defended through a review process involving the ultimate users—then the technological application should not be pursued.

A Needs-Driven Assessment

Because of the need for a technological solution to real combat problems, the 20 critical technologies should be prioritized by combat need. Combat needs fall into five categories.

The focus of this effort should be on the needs that are applicable to U.S. conventional combat in 2002. Because that combat takes place worldwide and may be low-, high-, or mid-intensity and may or may not be driven by a Soviet threat, the future needs are for a degree of maximum flexibility and deployability in the force. Development programs for technologies that contribute to meeting these needs should be funded and managed intensively.

Combat Needs

There are five high-leverage military capabilities (or combat needs) for which technology can provide a robust defense in a wide range of applications worldwide and into the next century. Those priorities for technology are

- Long-Range Reconnaissance, Surveillance, and Target Acquisition (RSTA)
- Long-Range Strike Systems
- Battle Management
- Survivability
- Training

Long-Range Reconnaissance, Surveillance, and Target Acquisition

Long-range reconnnaissance, surveillance, and target acquisition will become increasingly critical as we move into the late 1990s. Systems that provide these capabilities must be able to do so in all lighting and adverse weather conditions. They can achieve this with multimode sensors and advanced processing to sort out subtle target signals from clutter backgrounds.

Multimode sensor suites can be mounted on piloted and unpiloted airborne and space platforms. The types of platforms that lend themselves to long-range RSTA functions are the joint surveillance and target attack radar system (JSTARS), advanced tactical air reconnaissance system (ATARS), advanced synthetic aperture radar system (ASARS), GROUND RAIL, small unmanned aerial vehicles (UAV), and surveillance satellites.

Such systems will provide verification, warning, and intelligence information. We need to be able to monitor potential adversaries to ensure that they abide by treaty agreements. Long-range RSTA systems also provide early warning by detecting mobilization signatures early. Intelligence about such things as Third World ballistic missile site locations, chemical and nuclear plants, or changes in military posture must be accurate and timely.

A good long-range RSTA system is a strong deterrent because it can deny surprise. For example, JSTARS can see hundreds of kilometers, detect any traffic on roads and airfields that would be part of a combat buildup, and thus thwart any surprise.

Long-range RSTA systems can also provide targeting data for long-range strike systems so that the latter can attack time-urgent and important targets over a wide front.

The key enabling technologies include active sensors (moving target indicator [MTI] and synthetic aperture [SA], and laser radars), passive sensors (visual, infrared [IR], and ultraviolet [UV] sensors), microcircuits, and data processing.

Long-Range Strike Systems

We are on the brink of a revolution in conventional combat capability. Long-range strike systems that can kill hard mobile targets are nearly within our grasp.

The delivery system can be either air- or surface-launched and either launch-and-leave or man-in-the-loop. As indirect fire launch systems standing off at significant ranges, they will be difficult to target. Such systems can be used effectively in massing large amounts of killing firepower against a wide range of targets including, in particular, concentrations of armor and fire support weapons. The combination of high survivability and the massing of lethal firepower will make such weapons dominant in most battle situations.

Because of their high leverage, these systems will be increasingly valuable in central Europe as the forces are thinned down on both sides. They promise to be even more valuable, however, in Third World contingencies in which a small U.S. force can deal with adversaries decisively at standoff ranges.

Examples of the type of long-range strike systems in this category include the army tactical missile system (ATACMS), the joint tactical missile system (JTACMS), the air-to-ground missile 130 (AGM-130), the standoff land attack missile (SLAM), tacit

rainbow (the AGM-136, a loitering antiradar [or radiation] missile), and various types of cruise missiles.

The delivery accuracy needed in these long-range strike systems is available today. The key to gaining this new capability is to provide at an affordable cost the lethal deliverables, that is, munitions that are lethal against hard point targets such as tanks.

The enabling technologies include smart munitions—passive sensors (infrared, acoustic, electronic), active sensors (millimeter wavelength and laser radar), low-cost inertial guidance systems (with and without global positioning systems [GPS] links), fiber optics, microcircuits, data processing, explosively formed penetrators and shaped-charge warheads, area munitions (e.g., enhanced blast), composites, and signature control.

Battle Management

Battle management systems are needed to tie long-range RSTA and strike systems together so that targeting information provided by the former will allow the latter to react quickly and decisively in neutralizing an enemy concentration.

All levels of combat need battle management systems to connect and coordinate friendly assets and forces. As has been recognized for some time, effective battle management can be a force multiplier permitting numerically inferior forces to dominate. A battle management architecture that ties long-range systems together, however, offers the greatest potential for the future.

These systems must collect and fuse, through advanced processing techniques, intelligence information from many sources, selecting only what is needed to solve the fire support problem at hand. With the use of robust (jam-resistant) digital communications, command and control of the target acquisition and strike assets will be performed.

The enabling technologies include microcircuits, data fusion, automatic target recognition, parallel computer architecture, jam-resistant digital communications, and data processing (software).

The fusing of advanced sensors with brilliant weapons and battle management systems will bring a technological revolution on the battlefields of the next century. Some argue that these new technologies will restore supremacy to the defensive and sound the death knell of the tank. Others believe that these new technologies will place a premium on rapid, stealthy action and offensive operations. It is a question not likely to be completely

answered until the next conventional war is actually fought. In the meantime the United States should conduct rigorous and extensive testing and exercise programs to develop the best possible answers.

Survivability

Survivability has two basic elements: threat avoidance and threat tolerance. Survivability is achieved through a combination of means including hardness, agility, cover, and deception. Sometimes when dealing with the need for survivability, doctrinal and tactical measures can be more effective than systems applications, but technology can contribute in many ways, and today's technology provides the potential for large improvements in military systems in the immediate future. Of course, from the perspective of the individual fighter, survivability is the highest need on the battlefield.

Threat tolerance includes ballistic and electronic protection, adaptive controls, fire suppression, explosive venting, damage repair, and redundant structure, subsystems, and components. Threat avoidance includes cover and deception, jamming, threat suppression, signature reduction, warning, and agility. Building into combat systems the capability for rapid repair in battle should also be an essential design characteristic for future conventional combat systems. Enabling technologies for survivability include electronic components, microcircuits, data fusion, data processing software, fiber optics, low observability, composite materials, and fire extinguishing or retarding.

Training

Training is the key to success in combat. The current high state of training readiness of all U.S. military forces provides a solid basis for maintaining an effective conventional combat force to the year 2002. The superior state of training of U.S. forces was demonstrated in the superbly executed operations in the Persian Gulf in 1988 and in Panama in 1989 and in fact is credited by many of the participants with providing the critical advantage that U.S. forces had.

Training is largely a leadership-driven, labor-intensive activity. But shrewd technology investments can achieve high payoff for the dollars expended. Enabling technologies for

leveraging training include microcircuits, simulation and modelling, parallel computer architecture, graphics algorithms, and software. Technology can also help by imbedding training capabilities into systems provided for other combat needs. Integrating training and simulations technologies can provide large organizations with an approximation of real battlefield conditions that will not only make the organization better able to perform its combat functions, but also will contribute to individual preparedness.

Prospects for U.S. Research and Development

U.S. military research and development (R&D) has helped fuel the quality of life we often take for granted. Aerospace and jet propulsion technologies were advanced during World War II and laid the basis for the continuing U.S. dominance of civilian aircraft manufacture. In the more recent information age, military funding brought the transistor, lasers, the first computers, and supercomputers. That the federally funded R&D effort has been a national asset is indisputable.

But a fundamental shift has occurred in the way we conduct our national R&D effort. In 1989, gross domestic spending for R&D was $132 billion; all defense-related R&D was $41 billion, and Department of Defense Research, Development, Test and Evaluation (RDT&E) outlays were $37 billion. Within the national total, industry and other civilian R&D—from Barbie Dolls to nuclear medicine—accounted for $54 billion, or 53 percent. This is a reversal of the 1960 position when the federal government financed 54 percent of all national R&D.

In terms of performance, U.S. industry is second to none. Industry in this country performs 72 percent of all national R&D to include 87 percent of Pentagon RDT&E. By way of comparison, Japanese industry performs 67 percent of that country's R&D. U.S. industry is more than just an equal partner in U.S. technology development, it is the very engine of technological advancement.

Although the United States supports a robust R&D effort, global competition in high technology is accelerating. Our allies have closed the resources gap and are mounting a formidable assault on U.S. technological dominance. At the same time, the

U.S. industrial base is caught up in the globalization of all manufacturing. The impact of this new environment on technology is clear: the U.S. technological base is now a subset of global technology development.

Today, the United States accounts for half the Western world's R&D spending. But together, the Europeans and the Japanese spend roughly as much as we do on research and development. And despite the difficulties in establishing how much the Soviet Union spends on R&D, it is reasonable to believe that the scope of their military effort matches our own. No matter what the reasons for the new competitive environment in high technology, a critical factor is military R&D, and without its contributions, the United States would be at a significant competitive disadvantage.

In one very basic sense, the postwar foreign and economic policies of the United States set the stage for the growth of competition among the allies. Japan, not burdened by defense spending, has been able to target national resources for industrialization and economic growth. The Japanese economic and political system is uniquely structured to pursue national economic objectives—including technological superiority in key industrial sectors.

Europe emerged from World War II with the help of the Marshall Plan and achieved a modern industrial base. Since 1957, the European Economic Community has been the impetus for economic growth and development on the continent. Today, a consolidated European defense industry, aided by national governments and EC policies, is a strong competitor with U.S. industry.

Clearly we no longer have the resources to dominate across-the-board in technology nor in the key military technologies. DOD's 1989 critical technologies report identified five technologies in which the Soviet Union and its Warsaw Pact allies had achieved capabilities superior or equal to those of the United States. The Soviets will not lose that level of achievement in the reform process.

When European and Japanese capabilities are combined, we face equal or superior competition from our allies in fully 55 percent of the enabling technologies of the future. The NATO allies are world class competitors in 5 of the 22 critical technologies. The European challenge will continue to grow as EC initiatives gain momentum. Some of these programs are European

Strategic Program of Research in Information Technology (ESPRIT), Basic Research in Industrial Technology (BRITE), the multinational European Research Coordination Agency (EUREKA), and the Independent European Planning Group's European Cooperative Long-term Initiative for Defense (EUCLID). Japan leads the United States or has achieved parity in nine of the critical military technologies for the future. In 1988, Japan achieved a $20+ billion surplus in high technology trade with the United States. Europe and Japan are our new competitors for the twenty-first century. To face this competition, the United States must leverage its investments in critical technology areas.

The U.S. defense technology base is not ready for this challenge. Over the last decade, U.S. emphasis has shifted to development and away from basic and applied research. The National Science Foundation estimates that this country spent nearly twice as much on development as on research in 1989.

The same trend is evident in DOD spending for R&D. In fact, much of the increase in U.S. development spending is attributable to the Reagan era increases in defense advanced development. Pentagon spending for technology base research and exploratory development has declined both in constant dollar terms and as a percentage of overall RDT&E. The cumulative effect is that the Department of Defense now spends on the technology base little more than half of what it spent on that base in 1965.

Trends within defense industry R&D are also disturbing. Although independent research and development (IR&D) and bid and proposal (B&P) spending in the industry is up, since 1984 we have seen a decline in industry research and development. If these trends persist, by the year 2002 our defense industrial base will be spending more for competing than for developing.

Within the defense industry the largest companies are driving R&D. The top 20 contractors captured nearly 60 percent of all fiscal year (FY) 1988 RDT&E; the top 10 accounted for 45 percent. Recent reports, which are not inconsistent, point to an alarming decline in the defense industrial base. The recent CSIS report, *Deterrence in Decay*, identified a 67 percent decline in the number of firms supplying the Pentagon between 1982 and 1987. DOD reports an 18 percent drop in the number of prime contractors since 1985. Big industry is getting bigger, the smaller companies are leaving the defense business, and major contractors control the technology base.

Yet large defense corporations cannot be relied upon to seek the national interest at the expense of quarterly returns. In technology development large companies are becoming risk averse. At the end of an era of unprecedented military spending, the defense industry is going broke. Government policies, including the elimination of tax credits, lower progress payments, and second sourcing, have dramatically weakened the cash flow profiles of defense firms. In high technology businesses, a debt-to-equity (D/E) ratio of 50 percent is dangerous. One major firm reportedly has a 140 percent D/E ratio. Many have had their bond ratings lowered, making it more difficult and costly to borrow. And price/earnings ratios in the defense industry are so low that it makes little sense to issue stock as a source of new capital.

As a result of these trends, over the last decade boardroom emphasis has shifted from technological performance to costs, ethics, and Total Quality Management. Today, technology is at the bottom of boardroom priorities and is not changing. But the United States will lose its ability to apply technology to leverage the conventional combat battlefield unless fundamental changes in the defense technology and industrial base are made.

The Crisis in the Military Technology Development System

The purpose of the U.S. military technology acquisition system is to provide fielded technology to support military needs. Our technology is superior, but our process for getting it to the field is second class. None of the many acquisition reforms of the past 20 years has provided solutions to basic systemic flaws.

The acquisition system does not field new technological capabilities in new systems at a rate competitive with that of the threats to our security. We are, and have been for several years, behind the Soviets in the rate at which we modernize our basic conventional combat systems—aircraft, ship, armored vehicle, artillery, air defense, mine/countermine, and helicopter. In some systems such as armor/antiarmor the Soviets outmodernize us at a rate of about four to one; in indirect fire systems the rate differential is about six to one. Several reasons for this situation predominate.

The U.S. threat definition and projection system is too reactive. The tendency is to observe what the other side (the threat) has in test, or is fielding, and then try to catch up. While the United States is catching up, the other side continues to march ahead. By the time the catch-up system is fielded, the other side has fielded something new, and, despite the catch-up effort, the United States is still behind. The problem is not lack of knowledge about what the other side is doing; it is, rather, U.S. unwillingness to believe reasonable projections about what is in the opponents' full-scale engineering design stage at any given time. Historically, the United States tends to underestimate the threat capabilities—in time and in technology—by about 20 to 30 percent.

The United States now has an R&D fielding rate that sees its so-called advanced technology languishing on the laboratory bench while the other side moves its somewhat older technology out onto fielded systems. The tendency is to give in to the plea that for a few more dollars and a little more time the United States can have a great deal more capability. Inevitably a few more dollars turns into millions or hundreds of millions, a little more time turns into years, and the capability differential realized is virtually negligible.

The solution is a restructured acquisition system that is designed to move through the designated milestone process in realistic time lines that are specified in a way that allows the acquisition system to field new capabilities at a rate competitive with the threat. Generally in conventional combat there are three categories of systems. First, systems like tanks, infantry fighting vehicles, direct support artillery, electronic components, computers, forward area air defense systems, and such support vehicles as ammo carriers, bridges, and recovery vehicles need to be modernized about every five years to seven years. Second, those capabilities like helicopters, attack and close air support aircraft, general support artillery, and general support vehicles need to be modernized about every 10 to 14 years. Other systems need not be modernized but every 15 to 20 years or more. Time lines for intermediate milestones for the development of such systems should be marked and institutionalized to occur within these overall modernization rates. To encourage industry involvement in the right kinds of technologies, DOD must adopt a proactive market strategy for its technological and industrial investments.

Contrary to the rhetoric about a so-called peace dividend, the urgency of fixing the system goes up dramatically in the shadow of conventional force reductions. The only hope of the United States remaining viable in the face of substantive reductions is to ensure that it modernizes what little is left at a rate consistently better than that of the other side. The conventional combat force is therefore more critical in the strategic balance than ever before.

Conclusion

Technology, the application of science to solve real problems, is an enduring strength of the United States. It offers our greatest potential to deal with the threats to our security in a rapidly changing and increasingly uncertain world. But the United States is approaching the twenty-first century with vestiges of a nineteenth-century technology development system. We must fix that system now.

Two main thrusts are required to keep U.S. military technology in the lead. First, technological outputs must be more effectively matched with combat needs. No longer can thousands of technologies be kept alive in the system in the expectation that some day somehow one of them might emerge as a "silver bullet" to solve all of our military problems. U.S. technology investments must be prioritized on the basis of combat needs. The most promising must be funded and the less fruitful, terminated. A balanced investment strategy that does no more than perpetuate all the bureaucratic compartments of the present technology establishment will fall of its own weight as defense resources continue to diminish. The bureaucracy has already caused us to fall behind in the fielding of technological solutions to military problems even when resources were plentiful and growing. Attempting to perpetuate the present system for conventional combat 2002 risks losing the U.S. competitive edge.

The way to establish such priorities is to combine the thrusts of technology push and market pull through a net assessment process that begins with a hierarchy of conventional combat needs. Such a set of priorities has been suggested in this report.

The second major thrust required is fundamental restructuring of the defense acquisition system itself. The time it takes to field new systems must be reduced. Without this reduction of fielding time, the Soviets will continue to outpace the United States in increasing numbers of systems even as they reduce their defense spending. In addition, other non-Soviet military threats may emerge that will be equally capable of destroying U.S. conventional combat forces on the battlefield. A three-tiered approach has been suggested to restructure the U.S. defense acquisition system to provide more responsive modernization rates.

Although technology is an enduring but perishable U.S. strength, it is not a full solution to the problems of conventional combat needs for the year 2002. Optimum solutions to military problems must be found through integrating organizational and doctrinal approaches with new technologies. For some problems, technology is not the answer at all. For many, it is only part of the solution. While capitalizing on our technological strength, the United States must not allow itself to become mesmerized by a purely technological approach to solving all of its military needs. The more intense and difficult the problems of conventional combat become, the more it becomes evident that people—the soldiers, sailors, airmen, marines, and their leaders—constitute the critical and deciding element.

VII

Space: The High Ground of Conventional Combat 2002

Given the global nature of satellites, the military applications of space have traditionally focused on giving support to the strategic areas of national intelligence gathering and nuclear deterrence. Within the past 15 years, however, a growing emphasis has been placed on providing space support to conventional military operations. As the chances of nuclear war with the Soviet Union continue to diminish and the relative importance of other global threats increasingly occupy U.S. military planners, the use of space will undoubtedly move out of the margins and into the mainstream of U.S. conventional military planning.

Both a rapid, reliable warning of regional conflagration and an ability to make quick assessments and responses will therefore be needed. Space systems will furnish one of the most reliable means of providing such capabilities. Space support has several advantages for Third World conflict:

- Supplying early warning of emerging conflicts
- Providing rapid communications
- Being base independent
- Multiple tasking of space resources
- Minimizing the risk to American lives.

Furthermore, the conflict itself does not threaten the survivability of the system.

Space will form an important component of U.S. efforts to manage the full range of unforeseen conflicts that well may arise in the multipolar world of 2002. Also, the role of space in

supporting conventional forces undoubtedly will increase as space assets are called upon to supplement arms control verification regimes and to monitor the negotiated reduction of conventional forces from Europe over the next several years.

Formerly, space had been the medium of the technologists, the R&D community, and the highly classified intelligence world. Potential military users did not understand, were not privy to, and did not have confidence in U.S. space systems. Now a military space infrastructure exists to provide enhanced support to conventional forces.

The National Space Policy, signed by the president in January 1988, provides the policy impetus to support military forces from space. In addition to incorporating the support requirements of the SDI, the National Space Policy outlines four key areas of the military space program:

- *Space Support*: the means to launch and maintain space systems,
- *Force Enhancement*: the acquisition of space systems to meet military requirements,
- *Space Control*: the development of space capabilities to ensure U.S. freedom of action in space, and
- *Force Application*: R&D and planning to prepare for acquisition and deployment of space weapons systems and for strategic defense.

Current and planned U.S. space programs aim to provide conventional military forces by 2002 with three principal forms of support—navigation, surveillance (including weather, targeting, and warning) and communications.

For navigation, U.S. naval forces will continue to use the naval navigation satellite program (codename TRANSIT), which currently provides a global navigation capability to ships at sea. When the global positioning system (GPS) becomes fully operational in the early 1990s, it will significantly upgrade the timing and accuracy of such data, as well as expand the user community to all land, sea, and air forces. By 2002, the services could possess some 13,000 GPS receivers, with microminiaturization of the receivers to walkie-talkie size. All combat aircraft and ships will have access to the system, whose accuracy may reach to within 10 meters. Airborne receivers, in particular, will permit precise, all-weather close air support, interdiction, and offensive counter-air operations. Tactical ground commanders, down to

platoon level, will be able to plot their exact location when engaged in conflict. The GPS will revolutionize the way conventional forces fight in the future.

Surveillance requirements may be met by a wide range of National Technical Means. By 2002, for example, carrier battle groups and strategic bombers will have Defense Meteorological Satellite Program (DMSP) terminals, enabling real-time weather data to be incorporated in the orders and plans process. Transmitting data directly to portable terminals, DMSP can provide a view of any local area weather in real time, or it can store and dump data that can be integrated into a strategic weather view of the world.

A host of other systems are vying to form part of a future U.S. space inventory that could be adapted to support the surveillance requirements of U.S. conventional forces. These include the Defense Support Program (DSP) early warning satellite system, which has been the cornerstone of a U.S. global system to provide warning of a strategic missile attack on North America within minutes after a hostile launch occurs.

Systems under development include the Boost Surveillance and Tracking System (BSTS), the Space Surveillance and Tracking System (SSTS), and the space-based Wide Area Surveillance, Tracking and Targeting (WAST2) system for surveillance of air-breathing systems. When these systems are deployed, the data will play an important role, first, in detecting impending or incoming conventional attacks and, second, in supporting target acquisition for operational or strategic conventional strikes by U.S. forces throughout the world.

By 2002 a wide range of communications satellites could also exist to support U.S. conventional forces. These include the Defense Space Communications Satellite (DSC) program, the Naval Ultra High Frequency (UHF) Fleet Satellite Communications (FLEETSATCOM), the Naval Space Communications Gap Filler program (codename LEASAT), the FLEETSATCOM follow-on, and the Military Strategic and Tactical Communications Relay (MILSTAR) program. If projected funds are made available, some 1,000 MILSTAR terminals could be in operation by 2002—providing secure, reliable, antijam communications to all major forces from what has been described as a "heroically survivable" platform.

Conventional forces may also take advantage of certain commercial and nonmilitary government systems such as the NASA Tracking and Data Relay Satellite System (TDRSS), the

Earth Observation Satellite company's Land Satellite (LANDSAT), and other satellites that monitor the earth's environment. Due to its global, multispectral, and repetitive coverage of the world, the DOD already uses LANDSAT imagery extensively. Within the United States, the International Telecommunications Satellite Organization (INTELSAT) consortium, with the Communications Satellite Corporation (COMSAT) as its representative, is being encouraged to install commercial terminals on U.S. navy ships. Cooperation with the commercial space sector is strongly supported by the National Space Policy.

Potentially far-reaching strides into space support for the tactical commander are being made by DARPA, which is looking into a new generation of ground- or air-launched light satellites (LIGHTSATs). Its LIGHTSAT program consists of a new class of small, cost-effective satellites that could augment strategic space systems or could be used to support tactical commanders directly.

By 2002, great improvements will also have been made in the field of unpiloted aerial vehicles (UAVs). For example, DARPA is developing, with commercial partners, a High-Altitude Long Endurance (HALE) aircraft dubbed Condor—a 20,000-pound, 50,000+-foot ceiling, 10-kilowatt vehicle that could be a great asset to tactical commanders for use on sea, air, and land battlefields.

The current U.S. fleet of launch vehicles available to DOD includes the Scout, Delta, Atlas, and Titan (II, III, and IV) expendable launch vehicles, and the Space Shuttle. Although these launch vehicles have demonstrated high reliability and are competitive on a cost-per-pound-in-orbit basis for large payloads, they require an expensive support infrastructure to prepare and operate them, making them expensive on a per launch basis. They are ill suited for rapidly reconstituting or augmenting space systems in time of conflict. Moreover, they are presently bound to fixed launch facilities in California and Florida, which make them vulnerable to attack in a war.

Several programs are under way to improve launch capability for U.S. space systems. The Advanced Launch System (ALS) goal is to reduce by a factor of 10 the cost-per-pound-to-orbit of deploying large spacecraft. In conjunction with its LIGHTSAT program, DARPA is also developing two small, rapid response, low-cost launch vehicles. Pegasus is a winged, air-launched vehicle (that is dropped from a B-52 at 40,000 feet), which will be capable of placing the 50-pound class LIGHTSAT into a 400-nautical-mile low-earth orbit. A larger capacity vehicle under

development is the Standard Small Launch Vehicle (SSLV), a transportable, ground-launched rocket that can be ready for use within 72 hours after alert and can place the 150-pound-class LIGHTSAT into the same 400-nautical-mile orbit. A more distant solution is the single-stage-to-orbit vehicle that would operate much like an aircraft. The National Aerospace Plane (NASP) is the technology development program that aims to make this capability possible.

Challenges to the Utilization of Space

There is little doubt that changes in the international security environment and rapid technological advances point to an expanded use of space for conventional military operations by 2002. The path to incorporating space systems and their products onto the conventional combat battlefield is impeded, however, by four substantial obstacles: orbital mechanics, the bureaucracy, budgetary pressures, and unique service needs.

Orbital Mechanics

Despite their advantages, satellites are governed by the laws of orbital physics, which limit their ground coverage and availability. In other words, although orbital mechanics provides predictable availability, it limits the duration the satellite will be above a given location, except for those few systems that can be placed and maintained at a geostationary orbit at the 22,000-mile altitude. Moreover, to provide out-of-orbit support by maneuvering satellites requires a significant expenditure of propulsion energy, which can greatly shorten the useful lifetime of the spacecraft.

The Bureaucracy

A significant challenge is integrating the efforts of the administration, Congress, the DOD, and other government or civil agencies involved in space toward actions to field space systems that can effectively support national security needs throughout the spectrum of conflict. The level of direction and cooperation required has yet to be instilled in the bureaucratic process.

Individual agencies more often than not battle each other for capabilities to support their individual needs.

Budgetary Pressures

The current defense budget environment is unlikely to improve between now and 2002. Space systems are expensive. In the coming years, assembling the support necessary to provide extended space support of U.S. conventional forces will be difficult.

Unique Service Needs

Each service is faced with different terrain challenges, equipment infrastructures, security environments, military operational concepts and procedures, and command structures that result in different requirements for support from space systems. The individual mission of the user dictates to a great extent the nature of the information that is required and how it is delivered.

For instance, a ship's captain faces a dispersed, numerically small, but potentially very sophisticated adversary on an expansive battle area. But the tactical ground commander often faces thousands of small, relatively unsophisticated threats on a battlefield that from his perspective may be only a few meters square. A space sensor and data processing and dissemination system suitable for a navy captain might not be useful for a ground commander. Even more different are the information needs of the air commander who faces fixed, slow-moving, and very fast-moving adversaries simultaneously.

Other Challenges

The command structure itself probably presents the greatest challenge to the incorporation of space assets. A carrier battlegroup commander functions as a central user of tactical information, supported by an extensive staff as well as a multitude of equipment for processing data and presenting the information in meaningful formats. On the other hand, army and marine corps commands are comprised of many layers of small, dispersed operational units that have comparatively very little support infrastructure and limited ability to carry equipment across the battle area.

Differing threats, mission needs, and command structures of forces operating in different environments mean that neither technology nor the space systems will present the greatest challenge to incorporating space assets into conventional combat in 2002. The problems are not a lack of technological capability, but frequently ones of distribution, classification, and a lack of confidence, particularly in an age of bit-stream data rather than hard-copy products.

Space is unlikely to remain an area of superpower monopoly indefinitely. Several countries, including Brazil, Argentina, India, Japan, Israel, Egypt, and Iraq, are currently developing space launch capabilities. By 2002, U.S. forces may have to contend with both space surveillance of their actions by Third World countries and some form of ASAT or interference capability.

Exploiting Space for Conventional Combat 2002

Space will be the conventional combat high ground in the year 2002. Yet the United States is ill prepared to exploit its current position of strength in space either to use it to U.S. advantage or to deny its use to U.S. adversaries. Ten action steps are necessary:

1. *Incorporate the needs of conventional military forces into future space systems.* Too often the military utility of a space system is patched into the system after it is already in use. By bringing the military user into the overall requirements process early, future systems can be made to meet the needs of both traditional users (such as the intelligence community and strategic forces) and conventional military forces. To this end, the unified space command must build on its role as the focus for soliciting, collecting, consolidating, submitting, and advocating military requirements for space support from the services and from sister unified and specified commands.

2. *Establish a clear and reliable procedure for distributing the products of national space assets to conventional military users in time of conflict.* In the increasingly diffuse and sophisticated threat environment of the twenty-first century, the information from national space assets must be better incorporated into the conventional war-fighting capabilities of U.S. forces. In a high-intensity conflict, however, national command authorities may dominate the tasking of space assets. There is therefore a fear among the services that vital information from these systems would not be available to them in such a conflict. A reassessment of the procedures governing prioritization and distribution of data from national assets to the tactical users would encourage a full exploitation of the space systems already in the U.S. inventory. The multiple tasking of satellites to service the different needs of national agencies and the commanders in chief at different points in a satellite's orbit should be part of such a reassessment.
3. *Develop inexpensive satellites and launch systems that can be quickly deployed or used to augment or reconstitute space systems when necessary.* With upcoming reductions in forward-deployed U.S. air, sea, and land forces, the first U.S. eyes and ears on the scene of a potential conflict in 2002 will probably be a satellite. The ability to put sensor payloads into orbit on short notice must be maintained in a cost-effective manner. DARPA's LIGHTSAT program must be pressed forward. NASP should be funded to proceed apace.
4. *Develop high-altitude* UAVs *as part of a future* U.S. *high-low space mix.* High-altitude UAVs that could stay aloft for several days would be especially useful in localized military situations, particularly in an unsophisticated threat environment in which adversaries would lack the means to bring them down. The high-altitude vehicles would constitute an inexpensive and responsive force multiplier for the operational commander. Access to one's own over-the-horizon data in real time will have an immediate bearing on an operational or tactical commander's ability to maneuver and bring fire to bear on both AirLand and maritime battlefields.

5. *Improve the distribution of data from space to tactical commanders.* Whether U.S. forces are served by national assets, DOD satellites, LIGHTSATs, or UAVs, processing and distribution of data remain one of the main hurdles that must be overcome in applying space to conventional combat. The services should expand or establish intelligence centers at lower levels to receive, interpret, and disseminate digital images, including expansion of direct downlink systems.
6. *Design future space systems to be interoperable with existing or planned ground equipment and command centers.* The most expensive element of a space system is the ground support and data distribution infrastructure required. Therefore interoperability with current systems is necessary if new systems are to be affordable. On the ground, for example, the space data distribution system should interface with the army's mobile subscriber equipment that will be introduced well before 2002.

   In addressing interoperability, particular attention must be paid to the very different user requirements of each service, which depend on their mission and organizational structures. It will be difficult to make single solutions apply evenly to all three forms of U.S. force application—air, ground, and sea. Data from space must therefore be tailored so it can be fused with data from other sensors and collectors.
7. *Integrate space systems into the combined arms approach to military operations.* Space still tends to be treated as a system-unique force multiplier, not as a combined arms asset. But space systems can provide the surveillance, data transmission, and precise positioning information needed to achieve the potential of combined arms operations. Linking space-based surveillance assets with tactical fire control systems will therefore be an important capability needed in 2002.

   Currently, space-based fire control information can be passed directly into systems such as the Multiple-Launch Rocket System (MLRS). Space-based input must play a wider role in the coordination of long-range target acquisition among land, sea, and air forces, however.

8. *Train* U.S. *military forces in the use of space assets.* Given that military forces must train as they would fight, space support must be more fully integrated into the complete range of Joint and Service military exercises, including simulations when actual systems are not available for exercise support. Adequate priority should be accorded exercise participation for non-DOD government systems. The DOD could also fund the use of commercial satellites in exercises to ensure compatibility with military needs.
9. *Capitalize on advances being made in civilian electronics, space systems, and data transmission.* The greatest advances in the electronics industry are being made in the civilian field where industry is not hampered by the military acquisition system. With the increasing numbers of sophisticated commercial satellites, cooperation with U.S.—and, to a lesser extent, foreign—industry could enhance U.S. space capabilities and might save money as well.
10. *Develop a satellite defensive system and an* ASAT *capability.* Given the significant force-multiplying characteristics of space systems, both for U.S. forces and potential adversaries, the United States cannot afford to postpone developing an ASAT capability. The Soviet Union has laid special emphasis on space, deploying a great number of tracking satellites that may threaten U.S. conventional forces. With the spread of missile technology into the Third World, the ability to protect critical systems against growing and sophisticated external threats must form an integral part of the U.S. national security space program.

For this reason, the survivability of U.S. space assets must be ensured both by protecting U.S. systems (e.g., proliferation, redundancy, and hardening) and by eliminating enemy space systems. As space systems become increasingly important to national security, the use of space as a sanctuary will no longer be possible, and space itself will become another theater of war.

Space and Conventional Deterrence

Predicting exactly what sort of adversaries the United States will face in 2002 is impossible. The Soviet Union will undoubtedly still be the best armed of potential opponents and the one geographically positioned to do the most damage to U.S. global interests. Reports of the development of a Soviet reconnaissance/strike complex as part of their new "defensive" strategy could take U.S. military competition with the Soviets to a new technological level.

By 2002, however, U.S. global interests will face a more diverse and severe threat from other regional powers than at present. At the same time, the numbers of U.S. forces, both at home and forward-deployed, seem certain to diminish. In this context, U.S. space assets will play a vital role in overseeing a new form of conventional deterrence, one that depends on enhanced surveillance capabilities and speed of reaction, both in assessing the threat and in projecting force to meet the threat.

VIII

Globalized Competitive Strategies: A Policy Approach

We have raised many issues in this project. Our analysis has led us to recommend a set of policy preferences, investment priorities, and budget approaches, which, if adopted, would take U.S. national security strategy in new directions in the year 2002. Nothing less than such a comprehensive integration of efforts is needed. We believe that present approaches are inadequate to the task of the development and integration of force structures, doctrines, and technologies that will be required to maintain effective conventional forces for the twenty-first century as the United States embarks on an extended defense build down. A comprehensive policy framework is needed for making the difficult choices of the early 1990s—a framework that permits politicians to rise above pork-barrel politics, bureaucrats to ascend beyond turf battles, and military staffs to overcome service parochialism.

The emergence of new global threats, the reemergence of regional sources of conflict, and the withdrawal of Soviet troops from Eastern Europe do not mean that the military balance has suddenly become unimportant. Indeed, the political shadow cast by military power may be more, rather than less, powerful in 2002, though it certainly will be more subtle. Even in the new era the Soviet Union will be the preeminent military threat, and it is still the only country that can destroy the United States. Therefore, an ability to assess these changes and their impact on the threat is of critical importance to the United States.

One such way of assessing these changes and their potential impact is by using a competitive strategies approach. The term is something of a misnomer as competitive strategies is not a strategy at all, but rather an analytical methodology. Originally developed in the business community, it was modified by Andy Marshall, long-time director of the Office of Net Assessment at the Pentagon, for use in a military context. In its first form, competitive strategies sought to pit enduring U.S. strengths against chronic Soviet and Warsaw Pact weaknesses by using a chess-like move, counter-move, counter-counter-move methodology to forecast developments 15 to 20 years into the future. Competitive strategies need not be limited to the European area alone, however. Instead, the methodology can be broadened to view changes in the world outside of the Soviet bloc and can be used to assess the U.S. position against other potential competitors. Neither need it be confined to analysis of military power; it can assess other competitive arenas as well, including economic, technological, and political. The competitive strategies approach provides an organized process for thinking about the future.

In the national security policy context, competitive strategies can be used to answer several major questions. First, what is the Soviet Union up to? No one would begin to deny that fundamental changes are occurring within the Soviet Union. There exists, however, disagreement on what these changes will bring. The withdrawal of Soviet forces from their forward positions, for example, does not intrinsically make the Red Army less threatening or less dangerous. Several analysts have argued instead that this retrenchment will result in a leaner and meaner adversary with increased efficiency. Whatever these changes may mean, the fact remains that the Soviet Union will continue to be a significant threat against which the West will need to remain vigilant.

A second question that could benefit from a competitive strategies approach would be to define the future of nuclear weapons in Europe. Although some feel there will continue to be a nuclear dimension in Europe, its existence is clearly not a certainty. Nuclear weapons in Europe currently contribute to deterrence, but as the political landscape is developing, the retention of this nuclear capability, especially on today's scale, may be impossible. It is essential, however, that the question of the existence of a nuclear capability in Europe be addressed as part of the process of approaching questions of new conventional force levels.

Another issue that follows from this is the future of forward defense. For now, the United States remains committed to the concept of forward defense. This decision, however, rests primarily on political rather than military reasons. For the United States, in particular, a decision to withdraw from forward positions will create several new problems and exacerbate some old ones. Should the forces return to the continental United States—as seems likely—there will be an increased need for lift capabilities beyond those that exist today. Moreover, force posture modifications will need to be made to accommodate a rapid reintroduction of forces should a crisis arise. One development that might grow from this posture would be the allocation of specific missions to different armies—in South Korea, for example, assigning most ground force missions to the South Koreans, with air-strike responsibilities going to the Americans. This raises obvious questions about matching capabilities to missions. Competitive strategies could provide a methodology for assessing these alternatives and for evaluating their potential risks and benefits.

A further question that could benefit from a competitive strategies approach is the potential impact of arms control on force capabilities in Europe. Arms control, particularly conventional arms control, has become a reality of life in Europe. If a force reduction agreement is signed, the West must be wary of constraints being imposed to which it would not otherwise consent, particularly in the technological area. Normally the West would never agree to a limitation on its technological modernization of forces. But in a popular arms reduction agreement, it is possible that such a limitation might develop. Competitive strategies can assist in evaluating the potential costs and benefits of future arms control agreements, while simultaneously providing a forum for an interchange between the military and the arms negotiators.

Alternative Applications of Competitive Strategies

The employment of a competitive strategies approach is not restricted to the European theater, but can be applied in other areas as well. The competitive strategies approach has been

applied to the Pacific theater, for example, with some success. In the Pacific, the difficulty lies in identifying the competitors and defining the fields of competition. Although security competition may not be obvious today, it does not mean that there will not be competition in the future or that the Soviets will not return. Competitive strategies can help to identify potential adversaries and future threats in this area.

If the competitive strategies approach is taken far enough, it can serve as a tool for global strategic planning. Not only must the approach be applied to military competition with potential adversaries, but it must be expanded to consideration of competition across the spectrum of the elements of national power to include technological, economic, and political competition as well. Competitive strategies on its basic level is analogous to a chess game. Becoming "chess masters," capable of playing several different games simultaneously, will take the concept to the next level.

Competitive strategies can help develop portfolios of options, as well as assist in comparing the effectiveness of the different packages. In this manner force structures, doctrines, and technologies can be developed to achieve multiple functions and applications across the levels of conflict. One need not develop one set of technologies for low-intensity conflict, another for mid-intensity, and yet another for high-intensity conventional combat.

One such portfolio was developed and assessed through a proof-of-concept simulation conducted under the supervision of the project staff at a state-of-the-art facility made available by a corporate participant in the project. This portfolio consisted of the technology investment priorities recommended by the technology working group and included battle management/C^3I; reconnaissance, surveillance, and target acquisition; and long-range accurate strike systems. The simulation modeled the impact of the army tactical command and control system (ATCCS), the JSTARS and the ATACMS, and air force deep strike aircraft on the course of a battle in a representative sector of the European theater.

Three simulations were conducted at the facility using a sophisticated computer software and state-of-the-art hardware. The first simulation was conducted using current forces in Europe. The second simulation allowed the application of technology improvements, while the last simulation provided

U.S. forces with the future battle management/C³I concepts recommended by the working group.

The final analysis of the simulations provided some surprising results—some of which were completely unexpected. In the initial scenario with current-level forces, in terms of the maneuver force ratio, the U.S. force suffered dramatic and rapid attrition to the point where the enemy had a decided advantage at the conclusion of the four-hour simulation. When the U.S. force was equipped with the new technologies, however, the enemy was the one to suffer steady decline.

The surprising element to arise from this exercise appeared in the final scenario in which the U.S. force was provided with the recommended technology portfolio. Because the force had confidence in its superior intelligence as to the disposition and intent of the enemy's forces, the U.S. force chose to change its operational concept dramatically. Rather than reaching deep into the attacking enemy formations as soon as range and acquisition permitted, the U.S. commander waited until the bulk of the enemy forces were vulnerable to U.S. deep strikes just prior to engagement in the close-in battle. At this point in the fight the enemy was irreversibly committed to an attack of a discernible portion of U.S. defenses, but the U.S. force was not yet decisively engaged. As a result, the U.S. force suffered attrition for a period of about two-and-a-half hours until the enemy had arrived at the position the U.S. force was seeking. At that time, the U.S. force unleashed the full fury of the offensive on the enemy's deep targets and rapidly turned back the enemy's advantage until, at the conclusion of the scenario, the U.S. force achieved a superior position.

One conclusion to be drawn from the results of the simulation is that, no matter how sophisticated the model and how comprehensive the factors included in the analysis, the human element can never be adequately predicted. This became clear from the results of the final iteration in which the U.S. commander made a conscious decision to risk trading time and early losses for superior positioning and a culminating decision later. Developing a grand strategy using the competitive strategies methodology must take advantage of such analytical resources to test different reactions and counterreactions to see how multiple strategies compare.

The critical component of the competitive strategies approach is the assessment of the opponent's reactions. Clearly, what one's opponents might do can never be known for certain. But it is possible to anticipate the likely combinations of events and then select the package that best allows the United States to confront the widest variety of possibilities successfully. Competitive strategies can assist in formalizing this ongoing process.

Conclusions

The competitive strategies methodology is not a substitute for a national security strategy. Rather it is a productive and important tool for formulating and assessing the impact of alternative conventional combat investment options. Permiting not only the analysis of the effects of weapons versus weapons, the approach also structures analysis of the complex interactions among choices for technology, doctrine, and force structure. The advantage to using the move, counter-move, counter-counter-move methodology is in formalizing the process for looking 10 to 20 years ahead—further than is possible in most other current assessment processes. Sophisticated simulations can contribute immensely to this process.

Perhaps the greatest potential for the competitive strategies methodology is in encouraging decision makers to think in an organized fashion—and further into the future. Too often, major decisions have focused on a quick solution with inadequate thought to long-term implications. In the area of conventional forces, long-term thinking is absolutely critical. Without it, decisions that today seem practical militarily, and especially politically, could lead to a serious weakening of strategic stability with dangerous consequences.

Globally, the competitive strategies approach will draw together the military, political, economic, and social dimensions into a network of interconnecting plans that together comprise national strategy. Too often, policymakers have viewed these dimensions as separate entities, when in fact they form a complex but integrated whole. We urge the Defense Department to form a panel to address the issues raised by this report in the context of a globalized competitive strategies approach. Such a

panel should report to the secretary while operating under the review authority of the chairman of the Joint Chiefs of Staff.

The U.S. military is engaged in a fundamental series of changes that will result in the emergence in 2002 of an essentially different set of force structures, doctrines, and technologies. The U.S. armed forces in 2002 must not simply be a smaller version of what they are in 1990. To guide them through those changes we have characterized the nature of conventional combat of the future with a view toward developing appropriate military capabilities. We believe that a globalized competitive strategies approach should provide the requisite framework for integrating our recommended policy approaches into concrete plans, programs, and budgets. It is time now for the Bush administration and the Congress to build a bipartisan process to do just that. We hope our work has contributed to that end.

CSIS Books of Related Interest

Deterrence in a Time of Change

A Report of the CSIS Congressional Study Group on Future Strategic Systems

Forthcoming 1990

This study explores the impact of major international changes on such U.S. strategic forces policy as loosening of superpower blocs, newly emergent power centers, and the proliferation of long-range weapons of mass destruction to the Third World. Seeking to substantially redefine U.S. strategic forces policy, the study group proposes a range of affordable strategic offense/defense force structures that promote U.S. national security beyond the year 2000.

Making Defense Reform Work

A Report of the Joint Project on Monitoring Defense Reorganization

Harold Brown and James Schlesinger, cochairmen

72 pp. $19.95 1988

The joint CSIS-Johns Hopkins University Foreign Policy Institute Project on Monitoring Defense Reorganization was initiated in 1987 to assess the progress being made in the implemention of the 1986 Goldwater-Nichols legislation and the recommendations of the Packard Commission. There was good reason to wonder whether the reforms were being carried out. This concern and the more recent problems surrounding defense acquisition make this report even more timely in 1990 than it was then.

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James A. Blackwell, Jr., and Barry M. Blechman, editors

284 pp. $30.00 1990

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The Working Group participants provided valuable critiques as the work progressed, but they do not necessarily endorse or support the findings and recommendations of the project.

"The CSIS Conventional Combat 2002 project provides decision makers with an analysis of future combat trends, operational needs, and force structure. The project brought together more than 100 leading defense experts at a time when such expertise is vitally needed.

"The Conventional Combat 2002 points a way to the future in concluding that—although large-scale conventional conflict with the Soviet Union may be less likely than in the past—the United States must maintain its ability to address new and continuing threats in low-intensity and mid-intensity conflict.

"This very important and timely project makes clear that the restructuring of our nation's defenses must be guided by a deliberate and coherent strategy."

John Warner, United States Senator
Minority Chairman, Senate Armed Services Committee

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