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BOLSTERING DEFENSE INDUSTRIAL COMPETITIVENESS

**PRESERVING OUR HERITAGE
THE INDUSTRIAL BASE
SECURING OUR FUTURE**



**Report to the Secretary of Defense
by the
Under Secretary of Defense
(Acquisition)**

July 1988



THE UNDER SECRETARY OF DEFENSE

WASHINGTON, DC 20301

ACQUISITION

July 15, 1988

TO THE SECRETARY OF DEFENSE:

Enclosed are the results of our examination of the problems facing the United States defense manufacturing base. Our objective was to identify the actions necessary to prepare the Department better to deal with the dynamics of manufacturing worldwide. The recommendations we are already putting into action center around six major thrusts: forging the right relations with industry; improving the acquisition system; establishing defense industrial strategic plans that support our military strategic plans; developing manufacturing capabilities concurrent with development of weapon systems; laying the foundation now for the technical skill base required for tomorrow's defense needs; and ensuring that industrial base issues important to our defense benefit from the full spectrum of potential policy remedies, when appropriate.

An underlying message of this project, which is based on extensive advice from industry, academia, and other Government agencies, is that cooperation is an essential foundation to meeting and sustaining defense goals. Our cooperation with industry, with our allies, with other agencies, and with the Congress is imperative if we are to meet ever more sophisticated requirements with relatively fewer resources. Through this project, we are taking the first steps toward such cooperative relationships. Achieving these relationships, however, is requiring a culture change throughout the Department. Our challenge, as you have stated on many occasions, is to maintain serious and consistent efforts toward this goal. I am committed, as I know you are, to make this contribution.

Attention on the defense industrial base has focused on its problems, many of which have been characterized as insurmountable. While we certainly would not claim to have proposed solutions to all these problems, this project has shown, once again, that the nation is willing to assist the Department. We were most fortunate to have the assistance of a talented and dedicated staff, as well as hundreds of individuals, from Nobel laureates and chief executive officers to production line engineers, who generously gave of their time and ideas. The nation's great untapped resources of commitment and ingenuity are our best promise that the security of future generations can be assured.

A handwritten signature in black ink, appearing to be "W. B. Hall", is located at the bottom right of the page.

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than 300 Government policymakers, industry leaders, academicians, and representatives of professional societies and industry associations.

Our study, which addresses old issues from a new perspective, was designed to reach a broad consensus on Department of Defense actions that would make a difference in supporting combat operations. We did not attempt to identify industries in need of Government assistance nor to prescribe formulae for their resurrection. Nor did we elaborate any cookbook solutions; but rather we attempted to demonstrate that there is a role for the Department of Defense, and there are processes for defining, by industrial segment, what might be done.

The project itself is an example of the Department's efforts to forge the right relations with industry and to explore how we can bolster industrial competitiveness to benefit the Department of Defense and to ensure America's pre-eminence in tomorrow's world economy.

SUMMARY
REPORT TO THE SECRETARY OF DEFENSE

SUMMARY

The defense industrial base generally comprises the same manufacturers that produce goods for the general public. Few industries rely primarily or completely on the Department of Defense as their principal market. However, the Department depends on virtually every sector of the manufacturing base for materiel. Ninety-five percent of the manufactured goods purchased by the Department of Defense come from a broad spectrum of 215 industries. In 1985 the Department spent almost \$165 billion within these industries. This represented 4.1 percent of America's total gross national product and 21 per cent of the manufacturing gross national product. However, while the Department of Defense is a major purchaser of manufactured goods, we recognize that in many important sectors, such as electronics, we purchase only a small portion of total output. Even so, our market share (even in the electronics industry) can provide us with substantial leverage if properly managed.

In addition to meeting requirements for the production of today's weapon systems, the Department's investment in the industrial base must encourage the research and development for advanced technologies that are key to the next generation of weapon systems. These include technologies such as infrared focal plane arrays, microwave devices, advanced sensors, exotic alloys requiring powdered metallurgy technology, high temperature ceramic composites, and high temperature superconductors. Additionally, advanced manufacturing strategies, such as flexible computer-integrated manufacturing, must be developed for and integrated into the entire industrial base.

As a nation and as a continent, we no longer are totally self-sufficient in all essential materials or industries required to maintain a strong national defense. Consequently, we must identify requirements carefully and assess them against our industrial base capabilities. We must develop strategies that enable us to meet security needs with available resources. For those essential products the United States does not manufacture, we must rely on offshore sources or stockpiles. We can, however, offer incentives to establish domestic manufacturing industries for these products.

Clearly, the Department of Defense cannot provide massive financial assistance for every American industry characterized by a lack of international competitiveness, nor can we effectively provide incentives for every manufacturing industry critical to our defense. The

issue of competitiveness is one that requires continuing creativity and innovation within the private sector. There are numerous factors that industries themselves must come to grips with if they are to remain competitive in the international market place. There are also national issues, such as our tax code and antitrust laws, that warrant our attention. Our education system has been cited as providing a less than adequate technically trained labor force for the future. To the extent that these and other national issues affect the industrial base, the Department of Defense intends to stimulate, when warranted, appropriate activities throughout the Government to address them.

Within the Department of Defense acquisition process we have identified several areas that are impediments to efficient defense production. Frequent policy changes, emerging technologies, changing military requirements, the defense budgeting process, and program and budget instability make long-term planning difficult. Typically, small volume purchases and program *stretch-outs* contribute to an environment in which defense contractors have little incentive to make long-term investments in facilities with advanced capabilities that could yield higher quality and more competitive products.

Commercial market rewards for performance are lacking in the defense market. Unit cost reductions, quality improvement, shortened delivery times, etc., neither stimulate demand for additional units nor provide greater market share; nor do unit cost reductions result in increased profit. Emphasis on lowest bid cost may result in inadequate attention to life cycle costs, quality, and past performance.

The Department of Defense reliance upon detailed product and process specifications can be counterproductive. Outdated specifications frequently reduce innovation, inhibit improvements, and result in excessive administrative processes required to implement, monitor, waive, or modify specifications. Procurement processes focus mainly on prime contractors, even though materials and components purchased by prime contractors from lower-tier industries represent 50 to 85 percent of our total expenditures. Historically, the Department has had limited direct influence on the performance of subtier contractors because of considerable administrative difficulty in passing performance incentives through prime contractors to multiple levels of subcontractors and suppliers.

Finally, layers of bureaucracy and somewhat cumbersome contract administration processes add to the costs of doing business with the Department of Defense.

Government emphasis on oversight activities can lead business managers to focus more on meeting inspection requirements than on improving quality and productivity.

This Department of Defense report is designed to provide both a strategy and specific initiatives to address this concern. Integral to this strategy is a recognition that the Department's influence is, at the same time, significant and limited. The strategy suggests exploiting the Department's leadership and leverage potential to strengthen the industrial base, but not to the exclusion of other Departmental priorities such as a well equipped force structure. On the other hand, it is neither possible nor desirable for the Department to solve all the ills of the commercial manufacturing sector.

The cornerstone of this effort is cooperation with domestic industry and our allies. The United States could not build fortress America, even if this were a desirable objective. Nor can the Department of Defense reverse worldwide economic trends, such as the internationalization of manufacturing. To maximize domestic industry's potential, cooperative relationships must flourish among the Department of Defense, large corporations, and the lower-tier manufacturing industries that are the foundation of our industrial base.

Embedded in this action plan are six strategic thrusts: (1) forging the right relations with industry; (2) improving the acquisition system; (3) establishing defense industrial strategic plans that support our military strategic plans; (4) developing manufacturing capabilities concurrent with the development of weapon systems; (5) laying the foundation now for the technical skill base required for tomorrow's defense needs; and (6) ensuring that industrial base issues important to our defense benefit from the full spectrum of potential policy remedies, when appropriate. These recommendations were framed to address the fundamental causes of our industrial competitiveness problems, but we did not attempt to address all the symptoms. The recommendations reflect the complex and long-term nature of the problem and the need for the Department of Defense to establish the institutional mechanisms for a consistent and sustained approach in developing solutions.

We are working also on the shorter term solutions. Based on the findings and recommendations in this report, which were developed over the past year, we already have taken three broad, positive actions to affect our acquisition management process and to increase the Department's emphasis on production and manufacturing.

Considerable progress already has been made on the first of these, the newly established Defense Manufacturing Board. The Defense Manufacturing Board is modeled after the highly successful Defense Science Board. This organization is managed internally by the Department, with Board members appointed from industry, labor, and academia. It has the capability to analyze manufacturing issues salient to the Department and to explore manufacturing problems in classified programs. The Board is an advisory body, responsible to the Under Secretary of Defense (Acquisition), for policies on research, development and acquisition as they pertain to improving quality and manufacturing effectiveness in prime and subtier suppliers.

Secondly, the Manufacturing Strategy Committee is being established by the National Academy of Sciences to provide a parallel non-defense counterpart organization to the Defense Manufacturing Board. The members of this body will come largely from non-defense manufacturing companies and will provide the Under Secretary of Defense (Acquisition) policy advice on long-range manufacturing issues from much broader international and domestic perspectives.

Finally, the Department is establishing a Production Base Advocate as the focal point for manufacturing systems issues. Issues will range from the integration of manufacturing considerations into research and development and engineering policy, to the exploitation of innovative production and acquisition concepts in pilot programs. Industry repeatedly has expressed frustration with the Department's lack of responsiveness to suggestions for improvement. The Production Base Advocate now will provide industry with one focal point responsible for evaluating and acting upon industry's suggestions or complaints. The Production Base Advocate will have authority to experiment with new ideas and to suggest policy changes arising from such experiments. The office of the Production Base Advocate will be more than a coordinating office; it will be a center for innovation.

Perhaps the greatest challenge lies in developing innovative solutions to industrial base shortfalls. With the likelihood of little or no growth in defense budgets, increased funding on a broad front is not a practical approach to bolstering industrial competitiveness. Keys to finding innovative solutions include cooperating with industry and foreign nations; exploiting the Department's leadership role; stimulating private-sector initiatives in lieu of Government-dominated solutions; creating an attractive environment to enable private

sector ingenuity to flourish; and developing within the Department better means for anticipating problems and responding in a timely fashion.

The research for this report has provided a baseline for establishing means to evaluate criteria to define and prioritize the criticality of domestic products or capabilities. In assessing industrial base capability, traditional as well as global industrial resources available to the Department must be explored. Rather than create new data bases, the Department will develop the means quickly to access available data. Two existing Department of Defense initiatives in this field are the Defense Industrial Network and Project SOCRATES. The Defense Industrial Network monitors the capabilities of subtier and basic industries essential to defense production, drawing upon a large number of existing data bases. Project SOCRATES examines technology availability on a global basis. An evaluation is underway to consider the feasibility of consolidating both systems, combining their domestic industrial and global technology information into one comprehensive system. The Department also is exploring the possibility of utilizing the U.S. Census Bureau as a primary data collection source. These initiatives will minimize duplication, foster consistency, and provide currently unavailable essential data for comprehensive defense industrial analysis.

Many studies have been performed and much has been written about the deficiencies in the United States educational system. These shortcomings allegedly contribute to American manufacturers' lack of competitiveness. Focusing on manufacturing, there are inadequacies in our educational system that should be addressed. Regrettably, American industry has aggravated the problem by failing to emphasize manufacturing. There are numerous activities the Department of Defense will pursue that can make a positive contribution to enhance our individual and corporate manufacturing expertise.

We will tap the substantial education and training resources of the Department by concentrating our resources on building manufacturing management and systems expertise. We can have a significant impact on the current and the next generation of technically trained people. For example, the Military Departments sponsor large numbers of training courses and educational programs for both military and civilian personnel of the Department of Defense. We intend to request the Secretaries of the Military Departments to review their existing education and training programs and provide recommendations on utilizing education and training resources to improve the understanding and management of manufacturing functions.

The Department of Defense will encourage building university expertise in manufacturing by combining a scholarship program in manufacturing with industry and university efforts to build regional knowledge centers. As envisioned, the Department might offer scholarships at universities willing to build world class manufacturing management and technology programs. The schools would be selected based upon a commitment to maintain leading edge university expertise; industry support for endowing faculty positions to enable the world's best manufacturing managers to teach future generations; a commitment from industry to establish hiring programs to assure that the finest career opportunities are afforded to the new generation manufacturing manager; and a state and university commitment for faculty and curriculum development to stay on the leading edge of technological progress. This program should have a minimum commitment of five years from the Department of Defense, but must be matched by industry and participating universities.

Our security, while the explicit responsibility of the Department of Defense, is the implicit responsibility of the entire Federal Government and all the citizens of this nation. The Department has a mandate to ensure the existence of a viable industrial sector to meet defense requirements, both for leading edge technology and production capacity. But, this responsibility does not end with the resources of the Department of Defense. It is incumbent upon the Department to explore all potential solutions. Stated simply, the Department of Defense intends to seek the assistance of other Federal agencies to bolster industrial competitiveness when it impacts our security.

From now on, the Department regularly will seek the advice and assistance of the domestic and economic policymaking organizations of the Executive Branch to find the most cost effective solutions to defense industrial base deficiencies identified by the Department. Indeed, requests for advice and assistance were initiated during the extensive consultations with other departments and agencies which occurred in the effort leading to this report.

Preliminary discussions further exploring this approach have been held with both the Treasury Department and the Cabinet level Economic Policy Council. Both organizations support this concept and believe that more effective approaches utilizing broader policy perspectives should be implemented. This approach potentially could bring to bear the full weight of tax, trade, antitrust and other Government policies in supporting the security missions of this Department.

Brief synopses of the recommendations, together with comments on their current status, are presented in the remainder of this summary.

SYNOPSIS OF RECOMMENDATIONS AND PROGRESS

- ***Forging the Right Relations With Industry: Establish a Defense Manufacturing Board (similar to the Defense Science Board) and a Manufacturing Advisory Council (sponsored by an objective third party) to address defense manufacturing issues and problems.*** The Defense Manufacturing Board has been established and the National Academy of Sciences is forming the Defense Manufacturing Strategy Committee.
- ***Strategic Planning Task Force: Establish a task force to determine the best means to provide industrial support for military operational plans and determine which ones should be supported by industrial strategic planning.*** Once convened, it will report to the Deputy Under Secretary of Defense (Production Base and International Technology).
- ***Production Base Advocate: Establish an organizational focal point to receive, evaluate, and test innovative ideas to improve Department of Defense manufacturing programs.*** The Production Base Advocate's office will be established as the Office of the Deputy Under Secretary of Defense (Production Base and International Technology).
- ***Analytic Capability to Develop Defense Perspectives: Establish permanent, institutional mechanisms to acquire, analyze, and assess manufacturing and technology data.*** The Defense Industrial Network (which provides manufacturing data) and Project SOCRATES (which provides technology data) will be merged into a natural language, expert system within one organization, the Defense Industrial Base Information Administration, which will report to the Deputy Under Secretary of Defense (Production Base and International Technology).
- ***Foreign Dependencies: Develop and implement systems to provide visibility of critical foreign-sourced items in or proposed to be in new weapon systems, prior to the demonstration/validation decision milestone during the acquisition decision-making process.*** The Deputy Under Secretary of Defense (Production Base and International Technology) will be responsible for assessing foreign dependencies within the appropriate Defense Acquisition Board committees and for reporting the findings to the full Defense Acquisition Board.

- ***Factory Modernization Investments:*** Determine the appropriate incentives for productivity enhancing investment by defense contractors and create an environment more conducive to the successful administration of the Industrial Modernization Incentives Program. This is the first of several recommendations that will be submitted to the Defense Manufacturing Board and/or the Defense Manufacturing Strategy Committee so a methodology can be developed to achieve this objective.
- ***Program Stability:*** Achieve greater stability in major acquisition programs through the use of two-year budget cycles, multi-year contracts, and a more realistic (achievable) five-year program. This task will be further explored by the Defense Manufacturing Board and/or the Defense Manufacturing Strategy Committee.
- ***Life Cycle Costs:*** Raise the priority of using life cycle costs as a basic evaluation technique in acquisition programs. This has been implemented in the Defense Acquisition Board. The life cycle cost of a weapon system is now considered at every Defense Acquisition Board decision milestone and during the planning, programming and budgeting system process.
- ***Quality Control:*** Develop an effective "quality first" program. The Department has underway its Total Quality Management program with the objective of reducing weapon systems' costs while improving their quality in the field.
- ***Commercial Specifications and Processes:*** Increase the use of commercial manufacturing process and product specifications in lieu of unique military specifications. The Department's Defense Standardization Study Team recently concluded its activities and made twelve recommendations we are implementing, including: eliminating military specifications for commercial products, using multiple award schedules, reviewing all government specifications, converting specifications to *living documents*, and automating data bases. Additionally, the Defense Manufacturing Board and/or the Defense Manufacturing Strategy Committee will address how integrated manufacturing of commercial and military products can be achieved.
- ***Emphasis on Process Technology:*** Provide greater emphasis on the development and application of process technologies. The Defense Advanced Research Projects Agency has established the Defense Manufacturing Office to administer the Defense Manufacturing Initiative for developing manufacturing process technology that will help assure the Department of a domestic supply of affordable electronic, computer, and software components for rapid insertion into weapon systems.

- ***Technological Skill Base/Incentives for Technical Education/Educational Facilities/Education and Training:*** Increase the numbers of technically trained college graduates, doing it partially through scholarship programs sponsored by the Department of Defense; provide seed money for better educational facilities; and enhance education and training. The Deputy Under Secretary of Defense (Production Base and International Technology) will convene a task force from academia, industry, and Government to recommend Departmental courses of action.
- ***Production Base Impact Assessment:*** Establish a substantial analytic capability within the Legislative Branch dedicated exclusively to objective analysis of the impact of existing and proposed legislation on the United States manufacturing base and its ability to compete internationally.
- ***Coherent Tax Policies/Coherent Trade and Domestic Policies:*** The appropriate agencies conduct a comprehensive analysis of tax, trade, and domestic policies specifically focused on enhancing the international competitiveness of American manufacturing industries.
- ***Private Sector Issues:*** Identify and eliminate Government barriers to management motivation to achieve manufacturing excellence and competitiveness. To this end, the Department has increased progress payments, restricted the use of fixed price research and development contracts, and has more clearly defined the role of the program manager vis-a-vis contracting officers and auditors.

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identified in the report of the President's Commission on Industrial Competitiveness and in a great many recent private-sector examinations of the problem.

In this section, causes of the competitiveness problem are grouped into three major categories. The first category addresses management issues. These are particularly sensitive for Government to address without unacceptable intrusions into the private sector. Nevertheless, management is an issue that must be addressed in a continuing public forum on the future economic well-being and security of the United States.

The second category addresses Federal Government policies and practices that directly or indirectly affect the competitiveness of American industry. The third category addresses educational and cultural issues. Education issues might properly be a sub-set of the Government policies category, but are grouped separately because they are long-term and fundamental in nature, and involve Government at all levels, as well as the private sector. This category also addresses national cultural issues, which are broad, common, and inherently difficult to resolve. The Department of Defense has little capability to address or to influence these issues. Even the civil agencies and departments will find these difficult to address. There clearly is a role for the Government, however, beginning with the need to stimulate greater awareness of the problems we face and to build a national consensus to resolve them.

A. MANUFACTURING MANAGEMENT ISSUES

Management issues consistently were identified by participants from industry and academia as the most important causes of declining American industrial competitiveness. There was a general consensus among these participants that American management culture and practices are less effective in the global marketplace than those of foreign firms. Industrial and academic participants in this effort identified numerous specific management practices they considered harmful to American competitiveness.

There are historical reasons for current deficiencies. In the 1950s and 1960s, American industry dominated world manufacturing. American manufacturers could focus on quantity to the neglect of quality. American manufacturers were complacent, while other countries began building powerful new industrial infrastructures and developing superior process technology to manufacture easily-obtained American product designs and

technology. Among the results of this period that persist today are many senior managers who continue to view the nature of markets as national, not international, and the nature of product requirements as *good enough*, not *world class*.

B. GOVERNMENT POLICIES AND PRACTICES

Many Federal Government policies and practices reduce the competitiveness of American manufacturing companies. These policies and practices tend to be concentrated in the areas of tax, regulation, and antitrust enforcement, but they also range broadly over a number of other areas, including government attitudes toward domestic industry.

Some of America's trading partners have taken an aggressive approach to gaining, maintaining, and expanding market share in the United States, with substantial assistance from their governments. Other governments have helped give key technologies a head start and helped coordinate development, marketing, and pricing approaches by their manufacturers. In addition to aiding their own industries' technological efforts and exports, other governments have also created formidable non-tariff and tariff barriers to imports. The policies of other governments to subsidize and protect their industries are not matched by the United States Government. United States Government policies and actions to *level the playing field* in international trade have been inadequate.

Stronger, more focused efforts are required to create a "level playing field," particularly with respect to manufactured products. For example, United States tax laws should differentiate between *wealth-producing* activities and *wealth-redistributing* activities in treating amortization and depreciation. Productive investment could receive more favorable tax treatment than such activities as stock market speculation. Rare instances of United States Government efforts to foster domestic manufacturing are best characterized as efforts to correct the results of prior neglect, and usually focus on lagging rather than leading industries.

United States Government neglect of industrial competitiveness extends beyond the capital base and industrial technology. Compared with some other governments, the United States Government also has done very little to provide or to stimulate worker training and re-training programs in manufacturing. Limited efforts thus far have emphasized

Bolstering Defense Industrial Competitiveness

There also is an increasingly severe shortage of adequately trained scientific and engineering students flowing from American universities. American industrial laboratories and graduate schools in science and engineering are heavily populated by citizens of other countries. Almost half of the students in American graduate science and engineering schools are foreign.

Beyond the university level, American industry lacks adequate programs to provide continuing professional education and training to engineers and production workers. Continuing education and training programs in American industrial firms are often weak, ineffective, or non-existent. Stimulation of continuing education and training through tax incentives, Department of Defense contract incentives, and other Government efforts could be highly-productive and cost-effective.

American industrial competitiveness problems also are affected by a number of issues that can accurately be characterized as endemic to the American business culture. Clearly endemic problems, as discussed below, are among the most difficult to address effectively or to resolve. Equally clear, changes can be achieved only through broad national understanding and cooperative efforts.

Fundamental Skills

There is a widely perceived failure of American institutions to instill basic skills in our citizens. The general lack of familiarity with foreign languages and cultures in the United States population detracts from American international competitiveness. In years past, American business had little need to understand foreign markets. The United States economy consumed such a large portion of manufactured goods produced worldwide that foreign markets were not particularly important. Moreover, American goods were so superior to foreign goods that little competition existed for foreign sales. However, these market conditions have long since changed. The United States economy's share of total world consumption has declined substantially, and foreign-made products have equaled or surpassed their American-made counterparts in many instances. American society has been slow to respond to these changes. American products are less competitive in foreign markets because they are rarely designed to appeal to the cultural peculiarities of foreign consumers. American businessmen are at a disadvantage with their foreign competitors in understanding overseas mar-

kets and accessing technological advances made in these markets due to a general lack of foreign language skills. Language barriers pose a particularly difficult problem for American firms. Japanese and Europeans need only learn English to compete effectively in the world's largest market, but Americans must learn several languages to be as effective overseas.

There has been too little stimulus for the national effort required to change national attitudes toward work, to improve our educational systems, to emphasize needed skills, and to eliminate Government policies which adversely affect American performance in the world marketplace.

Awareness of the Problem

The absence of a national understanding (and Department of Defense understanding) that a healthy, productive manufacturing base is essential to our security greatly complicates efforts to develop and implement remedial measures. Manufacturing strength is needed to ensure that our armed forces can acquire the best weapons, and in quantities needed, to deter and defeat potential adversaries. Such strength encompasses commercial, as well as military production capacity. Commercial capacity adds the financial strength necessary to support research and development and capital investment and provides production resources that could be converted or diverted to military needs under emergency conditions.

Adversarial Relations

The deeply ingrained adversarial relationships between Government and industry and between management and labor are major causes of declining American industrial competitiveness. The relationship between the Government and industry is characterized by Government constraints on industry behavior intended to protect the public good against profiteering and shoddy performance; and by industry performance *by the numbers* to stay within Government constraints and to document compliance. The relationship between management and labor also is adversarial.

These adversarial relationships undermine industrial efficiency, responsiveness, and technological innovation. This Government-industry relationship forces industry to operate within an extremely restrictive environment and discourages (or even penalizes) innova-

tive behavior. Considerable industry effort is invested in satisfying Government paperwork requirements and responding to Government meddling in the manufacturing process.

The management-labor relationship prevents cooperative efforts to identify and implement innovative processes and tends to hold labor productivity to some minimal standard, actively inhibiting any worker capability or desire to improve. Historical barriers to cooperation between management and labor are only beginning to fall, and at much too slow a rate. There is not yet a pervasive sense of shared interests and objectives for the common good.

Other countries (Japan in particular) are much more effective than the United States in achieving industry/Government/labor cooperation on process and product development, and, through cooperation, are more effective in implementing new ideas to make manufacturing more efficient, responsive, and technologically advanced.

Short-Term Focus

American society, historically, has been action oriented and sharply focused on quick results. The short-term expectations that pervade American society have become a major impediment to the long-term planning necessary to compete effectively with other countries.

The equity market is the major source of capital for American industry, in contrast to Japan, where commercial banks are the principal providers of capital to industry. The American stock market is driven by short-term expectations, whereas Japanese banks historically have supported long-term investment. Short-term pressures in the American stock market are increasingly being exacerbated by large institutional investors, whose managers themselves are evaluated on short-term performance. Many of these are non-profit funds (for example, pension funds) that are free to move quickly in the market without regard for tax consequences, and, therefore, to increase the short-term volatility of the market.

Short-term profit expectation has emerged as an important reason for the relative lack of effectiveness of American technology-based businesses. There is a lack of understanding and acceptance in the investment community and the general public of the need for *decade plans* for technology-based businesses. Financial markets that place a premium on

short-term results may penalize a long-term orientation by reduced stock values, forced mergers, or hostile takeovers. Conversely, the Japanese (in particular) and Europeans are oriented more toward long-term results, with increasing success.

Lack of Manufacturing Prestige

The attitude in the United States toward manufacturing and manufacturing technology is somewhat negative. American universities have little to offer in these fields. Even within the manufacturing firm, research and design engineers are perceived to have more prestige than manufacturing engineers. One result is that the manufacturing function does not compete effectively for high-quality personnel. (Conversely, the Japanese have a high regard for manufacturing and are totally committed to innovation in both process and product.) These attitudes (and resultant rewards systems) toward manufacturing careers often prevent the best people from beginning or sustaining careers in manufacturing.

CHAPTER IV

DEFENSE POLICY ISSUES

In seeking more comprehensive information on the health of the defense industrial base, the Department of Defense sought to evaluate whether the overall strength of our industrial base masks any weaknesses in individual defense-critical industries.

The Defense Economic Impact Modeling System and other tools were used to identify defense-critical industries. Critical industries are those in which the majority of the Department of Defense budget is spent, directly and indirectly, as well as industries vital to defense production. Two hundred fifteen individual industries were identified, accounting for about 95 percent of Department of Defense purchases from the manufacturing sector. A series of six indicators was developed and applied to each industry: import share of the domestic market; growth in capacity; growth in shipments; capital expenditures expressed as a ratio to industry shipments; productivity growth; and profitability. Comparisons based on the indicators were then drawn between defense-critical industries and the overall United States manufacturing sector. Finally, a ranking of the critical defense industries based on a composite of all six indicators identified defense-critical industries with the poorest overall performance.

Based on this review, which covers the period from 1980 through 1985, we drew the following conclusions:

- Critical defense industries did no worse than overall manufacturers in maintaining a domestic market share in the face of substantial import growth;
- Critical defense industries did worse than overall manufacturers in terms of adding to productive capacity, with only 41 percent of critical defense industries matching or exceeding the overall manufacturing average growth in productive capacity;
- Three-quarters of critical defense industries achieved worse than average growth in real shipments;
- Sixty-two percent of critical defense industries had lower-than-average capital expenditures in 1980. This adverse trend continued in 1985, when 72 percent had lower-than-average capital expenditures;

- Forty-seven percent of critical defense industries had below-average productivity growth (17 actually had declining productivity);
- Critical defense industries achieved average or above average profitability.

These trends, while not definitive, are disturbing, particularly, with respect to indicators of future productivity and competitiveness.

A. THE DEPARTMENT OF DEFENSE MISSION

The mission of the Department of Defense is to provide for the common defense. Political and strategic realities require this to be accomplished through a worldwide military command structure. At the heart of the deterrent power of the United States military presence is an inventory of sophisticated military equipment and the human resources to manage and operate it. These resources are drawn and replenished, in large part, from the same pool of resources that fuel the general industrial economy.

As we look to the future, two fundamental problems threaten Department of Defense capabilities to maintain a modern inventory of qualitatively superior military equipment. The first is the environment in which the Department of Defense and industry conduct business. The high and rising costs of our major weapon systems appear driven by an acquisition system that encourages long acquisition cycles, high development and production costs, and sometimes obsolete technology. These problems most recently have been addressed by the *Packard Commission*. Some of the recommendations of the Commission have been implemented, others are in the process of being implemented, and others are under active consideration.

Yet, even if all of the Commission's recommendations were adopted and proved to be effective, a second problem would remain: many of the strategic industrial sectors that support the production of modern weapon systems are being threatened by intense, long-term competitive pressures from foreign producers. These include: semiconductors and semiconductor equipment, shipbuilding, automobiles, construction equipment, machine tools,

flexible manufacturing systems, ball and roller bearings, castings, forgings, steel, and ceramics, to list a few.¹

We do not know with any degree of certainty how these developments ultimately will affect our national security. We do know that they give cause for concern. Our capacity to build or replace critical force structures independently of economic and political decisions of other sovereign powers is essential to our security. The Department of Defense, therefore, must ensure that its actions and policies (especially, but not exclusively, in the acquisition arena), as well as the actions and policies of other government institutions, do not weaken our manufacturing sector and thereby degrade our defense posture.

Department of Defense action must be sensitive to the general economic health of the nation. The Department's concern for the health of the manufacturing sector and for individual industries within that sector should not be construed as an endorsement of sectoral policies for the economy as a whole. On the other hand, the Department's competitiveness initiative has identified a number of national policy initiatives aimed at bolstering the general health of the manufacturing sector, and it is appropriate for the Department to provide a security perspective to influence actions by the appropriate agencies.

Neither the nation nor the Department of Defense can afford policies which do nothing but protect failing industries or firms. Not only would these aggravate the weapon systems cost-growth problems identified by the *Packard Commission*, but, in the absence of counteracting incentives, such protection would undermine the competitiveness that this Department of Defense initiative aims to achieve. Protectionism also would be a threat to cooperative production agreements with our allies. The United States has encouraged a *two-way street* in military trade with our allies primarily as a means of balancing the costs of military alliances. The abrogation of such agreements by domestic interests may result in higher costs, reduced competitiveness, loss of interoperability, and, to this extent, should continue to be discouraged.

¹*U.S. Industrial Base Dependence/Vulnerability*, Roderick L. Vawter, National Defense University, December 1986. Our sense of the term "strategic industry" is discussed in chapter II of this report.

B. SECURITY CONCERNS

From one perspective, there are at least four reasons why the Department of Defense is, and should be, concerned about the overall competitive health of the United States manufacturing base.

First, the Department has a direct responsibility toward the sectors of the economy that constitute the defense industrial base. In many of the transactions between the Department and the industries that produce the instruments of military deterrence, the influences of Government procurement regulations and a single-buyer market structure have created a unique business environment. The Department of Defense must pay close attention to how its policies (and the policies of other Government agencies and institutions) affect this business environment and the extent to which the ultimate objectives of assuring our security are served by this environment.

Second, the vitality of our manufacturing economy in general ultimately determines the war-fighting power of our nation's force structure. The economy's latent capability to enhance current forces in response to strategic threats is a critical element of our deterrence strategy.

Third, the Department of Defense is cognizant of its formative influence on the larger manufacturing economy. Through its impact on the employment of scientists, engineers, and factory workers, its research and development expenditures (particularly in advanced manufacturing technologies), and its role in fostering capital investment, the Department's influence on innovation and manufacturing far exceeds its relatively small share of expenditures in our national income accounts.

Finally, the weapon systems for our nation's defense are purchased, in the long-run, from revenues generated by a healthy and growing economy. Such economic growth has allowed the nation to pay for its defense. For many years, the cost of our worldwide security obligations has been less than seven percent of our gross national product.

C. DEPARTMENT OF DEFENSE CONCERNS

The report of the Defense Science Board Task Force on Defense Semiconductor Dependency published in February 1987 was directed specifically at the semiconductor problem, but many of its findings and conclusions are equally applicable to other lower-tier industries that, collectively, provide the technological backbone of advanced weapon systems.

Competitive pressures, particularly from Japan and the newly emerging, economically competitive countries of Asia — Taiwan, Hong Kong, Singapore, and Korea — as well as Western Europe, are contributing to the relative decline of industries that are important to America's defense. As in the semiconductor case, the Department of Defense is the buyer of relatively small portions of these industries' total output, but, nevertheless, is absolutely dependent on these industries for its weapon systems. In most of these industries, volume production for commercial markets is essential to controlling unit costs and maintaining world class standards of quality.

As the commercial base has eroded, technology leadership also has moved, or is moving, offshore because technology leadership is dependent on the commercial base for revenues to support research, development, and investment. Thus, while the Department of Defense has no direct responsibility for ensuring the vitality of commercial manufacturing in the United States, it is unable to meet its mission requirements effectively without a broadly capable industrial base.

In a growing number of industry segments, if current trends continue, the Department of Defense will be dependent on foreign-sourced hardware and technology in the acquisition of the technologically superior weapon systems that are fundamental to our strategy of offsetting numerical inferiority with technological superiority. Specific elements of Department of Defense concerns are discussed in the remaining paragraphs of this section.

Technology Leadership

There is a substantial body of evidence that technological leadership is irrevocably tied to manufacturing capacity and leadership. The revenues generated by successful manufacturing are essential to achieving and maintaining the levels of research and

development required for technological leadership. Without technological leadership, the Department of Defense cannot count on industry's ability to produce affordable, high-quality, state-of-the-art weapon systems. In many industry sectors that are key to defense production, the manufacturing base has declined, and as a result the Department of Defense (and the United States generally) is now beginning to experience the reality of declining technological leadership.

Foreign Ownership of American Manufacturing Facilities

The issue of foreign ownership of American manufacturing facilities has not received adequate attention. The most common view is that the rapidly increasing level of foreign ownership is beneficial to the United States. In this view, such investment reduces the magnitude of the trade deficit, provides jobs for Americans, and increases domestic tax revenues. This view overlooks economic issues such as the long-term impact on the current account of a continuing flow from the United States of repatriated profits and other fees. More importantly, it overlooks the fact that ownership tends to dictate the geographic location of the underlying technologies. Security concerns are not resolved by domestic manufacturing facilities that are dependent on technologies controlled by other nations.

Manufacturing Technologies

Particularly devastating in the long-term is the loss of key production technologies and equipment. In some vitally important technologies, the battle may already have been lost.

Numerically-controlled and computer numerically-controlled machine tools (developed in the United States with Department of Defense funds) represent one such critical technology where the lead already has shifted. The fact of lost leadership is reflected in procurements by American manufacturers of advanced machine tools from Europe and Japan. Cost is often quoted as a determining factor in the decision to buy foreign tools. Delivery terms are another factor. But the decision is most often made on the basis of quality and advanced features.

Electronics manufacturing equipment is another example of this destructive trend. American semiconductor manufacturers, increasingly hard-pressed by foreign competitors, have survival as their primary goal. In many categories of semiconductor manufacturing equipment, the technological lead clearly has passed to other nations, primarily Japan, and American semiconductor manufacturers are buying Japanese manufacturing equipment because it is the best available.

This is but the leading edge of scores of technologies where other nations are developing the most advanced manufacturing technologies for the most advanced products. Such loss of supremacy in manufacturing technologies is a particularly insidious threat to American technological and manufacturing leadership. As long as foreign state-of-the-art manufacturing equipment continues to be commercially available to American manufacturers (and they elect to purchase it), the decline of equivalent American equipment industries barely is noticed until an evolutionary process reaches crisis proportions.

The decline of manufacturing equipment industries is of particular concern to the Department of Defense. As long as state-of-the-art production equipment is manufactured in the United States, there is a substantial capability to reconstitute or expand American product industries. However, without the basic tools for manufacturing, this capability virtually disappears, leaving United States security vulnerable to the political and economic processes of other nations.

Foreign Dependencies

Foreign sourcing of key parts, components, and complete products is an extensive and growing business practice in both commercial and defense manufacturing. Foreign sourcing may evolve over time into foreign dependencies. Potential foreign dependencies are areas of concern. While this issue has been studied extensively on an *ad hoc* basis, and anecdotal evidence abounds, there are few, even moderately comprehensive studies of foreign-sourced components of key weapon systems.

The potential for divergent political or economic interests to disrupt the free flow of the most advanced technologies and products has never been addressed adequately in the few, limited American assessments of foreign dependencies. There was, perhaps, no need

for such assessments when the United States was the world leader in virtually all militarily critical technologies. This clearly is not the case today. Sole source dependencies on foreign technologies for essential weapon systems components are inherently risky.

D. UNDERLYING CAUSES OF COMPETITIVENESS PROBLEMS IN THE DEFENSE INDUSTRIAL BASE

This section presents brief summaries of Department of Defense–related causes of problems in the defense industrial base. With one exception, the order of presentation is not intended to imply priority or relative importance. The exception, which is considered to be fundamental to further progress in improving the competitiveness of American defense manufacturing industries, is the necessity to establish permanent organizational structures within the Department dedicated to manufacturing excellence.

Program and Budget Instability

Constant budget turbulence, which makes effective long–term planning impossible, and frequent changes in the *rules of the game* (competition requirements, profitability, audit standards, etc.) are major impediments to achieving efficient manufacturing operations. These problems are aggravated by small volume procurements, year–to–year program uncertainties, and program stretch–outs that contribute to an environment in which Department of Defense contractors are unwilling to invest in systems for productivity or quality improvements. The rate of return on such investments is not only low, but uncertain as well. (It should be noted that after–the–fact estimates of the profits of defense firms are contested. The findings of the last major review of profits, the Defense Financial and Investment Review (DFAIR), a 1985 Department of Defense study, are contested by the United States General Accounting Office. The study also has been characterized by a major investment banking firm as “less than carefully conducted.”) Despite the lack of precise data, participants in this current effort believe that defense business traditionally has earned a low rate of profit; but that other factors, such as cash flow and certainty of return, have compensated for this. Recent changes are reducing or eliminating these incentives as well. This is particularly damaging in the case of diversified companies or electronics subcontractors, who can — and do — disinvest from defense.

Competition, as currently practiced by the Department of Defense, adds another reason for contractors not to invest in product or process research and development because of the likelihood that the Government will require the results of their investment to be transferred to competitors.

Absence of Market Incentives

The absence of normal market incentives in Department of Defense procurements is a barrier to efficient operations. Unit cost reductions, quality improvements, shortened delivery times, etc., do not stimulate demand for additional units or provide greater market share, nor do unit cost reductions result in increased profit (more often, the reverse is true). Increased investment in plant, equipment, training, etc., has no direct bearing on future contracts. A superior product or manufacturing process will not yield either higher profits or improved market share. The absence of such normal market incentives and rewards is compensated for by massive government efforts to prescribe substitute control mechanisms, which are themselves barriers to improvement.

Department of Defense Procurement Policies

In the very forthright views of the experts we consulted, Department of Defense procurement policies and regulations contain many characteristics which inhibit achievement of manufacturing excellence, including:

- Emphasis on price, which forces short cuts and reduces incentives for investments in new equipment and quality systems;
- Evaluation criteria focused totally on product performance, at the expense of producibility and reliability;
- Emphasis on forcing contractors to fund (and assume risk for) program specific tooling, test equipment, etc.;
- The absence of risk-sharing for innovation;
- Emphasis on low acquisition cost and schedule compliance, to the virtual exclusion of low life cycle cost (quality, maintainability, ease of use);

- Intense pressure on profits—down to levels that virtually guarantee the contractor will have very limited ability to invest in future productivity programs.

Department of Defense Organization for Acquisition Management

The manner in which the Department of Defense is organized to manage acquisition is a barrier to efficient manufacturing: functional segmentation (for example, between the procuring contracting officer, administrative contracting officer, plant representatives, Defense Contract Administration Service, Defense Contract Audit Agency, etc.) causes contractors to organize reactively (and defensively) along similar lines, to the detriment of efficient operations.

The organizational problem was exacerbated by lack of discipline in the system. Practices vary significantly from one procurement office to another and from one Military Department to another. Different Government agencies (Defense Contract Administration Service, Air Force Contract Management Division, National Aeronautics and Space Administration, etc.) assigned surveillance responsibilities over multi-divisional companies apply agency/Military Department unique rules, regulations, procedures, etc., with extremely adverse impact on company efficiency and costs. Requirements and procedures are also inconsistent from one type of procurement to another. Different rules apply for production spares and replenishment spares. Primes are required to test purchased components, but the Department of Defense does not test the same components when it buys them directly from the supplier.

Emphasis on Competition

Since the inception of offices of competition advocates in each of the Military Departments and competition advocates in all major buying commands, the Department of Defense has emphasized competition on the basis of initial production price, sometimes virtually ignoring contractors' capabilities and records for quality and timely performance, as well as down-stream (life cycle) costs. Frequently, price competition does not provide the best value to the Government. Emphasis, under the Competition in Contracting Act, on low-cost

bidders favors companies who bid fully depreciated equipment and hurts those with modern facilities. The emphasis should shift to quality and responsiveness.

Product and Process Specification

The Department's heavy reliance upon process and production specifications is frequently counterproductive. Components are required to be manufactured by processes and to standards which are not state-of-the-art and which do not provide the best product at the best price. The manufacturer, who has the greatest expertise, has little voice in component design or manufacturing processes.

Lack of consistency and uniformity in product and process specifications among various Government agencies also has adverse impact on contractor operations and costs (for example, there have even been instances where occupational safety and health requirements prohibit manufacturing to Department of Defense specifications).

Life Cycle Costing

Logistic support analysis requirements included in many contracts provide the information required for effective life cycle costing (human resources and training requirements, support equipment requirements, spare parts requirements, etc.), but Government personnel rarely use the data effectively. Most Department of Defense contracting officers focus totally on acquisition cost and pay little attention to the concept of total life cycle costing.

Life cycle costs are inherently less certain than acquisition costs, and Government decisionmakers are less willing to assume the risk of relying on life-cycle projections. The Department has no adequate means to monitor and evaluate actual versus projected life cycle costs (and, hence, no means to gain additional confidence in evaluating contractors' projected life cycle costs).

Subcontractors and Suppliers

The Department of Defense procurement processes are focused on prime contractors, even though purchased materials and components supplied by subcontractors represent 50 to 85 percent of the total cost. The Department does not require or encourage vendors' participation in strategic planning decisions or design processes. In fact, requirements of the competition advocates for *free and open* price competition for subcontractors and suppliers have the effect of keeping the supplier base in constant turmoil and make it virtually impossible for defense contractors to build a stable base of reliable, high quality, cost-effective vendors. This is the opposite of the practice generally credited for the high quality of Japanese products.

Emphasis on price competition by the Congress and the Department of Defense effectively precludes the development of long-term relationships between prime contractors and suppliers and stimulates an adversarial relationship between them. The absence of long-term relationships does not permit extended, cooperative design, development, and manufacturing exchanges between the primes and suppliers. Little or no emphasis is placed on value analysis or value engineering by suppliers or their primes.

Annual price competitions are weakened by the refusal of many of the best-qualified suppliers to participate due to their reluctance to become involved in complex, expensive, and non-productive Government rules and regulations. Many desirable, highly-qualified suppliers refuse to do business with defense prime contractors because of the sheer weight of compliance with the body of laws, regulations, rules, and procedures that primes are required to pass through from the Government to them. This narrows the range of potential suppliers and reduces competition.

From the prime contractors' point of view, the flow-down requirements for subcontracts are virtually impossible to administer on the limited margin allowed by the Department of Defense. Small and disadvantaged business set-aside requirements imposed on defense prime contractors (together with excessive requirements for record-keeping and reporting and multiple, uncoordinated compliance reviews) further increase the administrative costs of doing business with the Department of Defense and may result in the lower quality and/or higher cost of purchased components.

Contract Administration

Multiple layers and large numbers of Government overseers, inspectors, and auditors (Army/Navy/Air Force plant representative offices, the Defense Contract Administration Service, administrative contracting offices, the Defense Contract Audit Agency, etc.), many of whom are resident in contractors' facilities, add significantly to the costs of doing business with the Department of Defense.

One result of the Government's heavy emphasis on oversight activities is that management focuses its attention more on passing audits and inspections than on improving quality and productivity. Many defense contractors believe that the Government's practice of imposing layer-upon-layer of quality inspectors and after-the-fact quality controls actually inhibits the development of modern systems such as statistical process control and other effective quality systems.

Management Issues

For firms in the defense industrial base, factors other than engineering excellence, innovation, and product quality often determine success or failure. These include their political constituency and the effectiveness of Washington lobbying efforts (both of which tend to restrict competition). Even management skills must be different. The need to have detailed knowledge of the *ins and outs* of the procurement process, the patience to deal with the process, and large and capable staffs of *documenters* to comply with reporting/compliance requirements imposed by the Department of Defense and Congress all are skills virtually unknown outside defense business.

For defense contractors, as compared with commercial manufacturers, management has a much smaller impact because of the degree to which contractors' operations are controlled and limited by the Department and the Congress. Micromanagement of defense programs and budgets and of contractor operations, a strong tendency to legislate broad remedies in response to isolated *horror stories*, and continuing use of defense procurements as instruments of social policy all are examples of Departmental and congressional activities that significantly add to the Department's costs and impede efficient, professional procurement efforts.

Many defense contractors feel that modern manufacturing management techniques (just-in-time inventory control, statistical process control, etc.) do not apply to them because of limitations imposed by Department of Defense rules, regulations and practices. For example, a large bureaucracy dedicated to *inspecting in* quality severely restricts contractors' incentives and ability to apply statistical process controls to *build in* quality.

It is difficult, to use another example, for a defense contractor to establish a research and development strategy, and difficult to measure its effectiveness. Research and development productivity in the private sector is controlled by strategic planning, resource allocation, and corporate culture. In defense industry, contractors have little control over the first two factors (which are largely controlled by Government budget decisions and regulations).

Emphasis on meeting specifications also reduces incentives for quality and innovation. Non-defense companies tend to be more efficient and innovative, not because their people are better, but because they are free of the restrictions imposed by the Congress and the Department of Defense.

CHAPTER V

BOLSTERING INDUSTRIAL COMPETITIVENESS

The several hundreds of Government and private sector experts who contributed to this effort were extremely forthright -- frequently even harsh -- in their assessments of the problems in our manufacturing base attributable to private sector managers, Government policies, and most notably, Department of Defense policies and practices. We seriously have evaluated their contributions and have attempted to report those assessments faithfully and act upon them effectively.

Over the course of this effort, we determined that a significant number of required improvements are possible within the existing authority of the Department. In fact, we identified numerous ongoing Departmental programs and recent initiatives to improve manufacturing operations in the defense industrial base. These include a number of actions that relate directly to the conclusions and recommendations of this report.

There are other recommended actions that primarily are directed to the Department of Defense, but will require coordination with the Congress and other departments and agencies of the Executive Branch. Finally, there are recommendations for action by the Government that clearly are beyond the scope of Department of Defense responsibility and authority. For these, the Department of Defense urges prompt consideration by the appropriate authorities.

CONCLUSIONS AND RECOMMENDATIONS

The remaining portion of this section contains 19 conclusions and recommendations for action by the Department of Defense and other Government departments and agencies. The order of presentation generally corresponds with our six major thrusts: (1) forging the right relations with industry; (2) improving the acquisition system; (3) establishing defense industrial strategic plans that support our military strategic plans; (4) developing manufacturing capabilities concurrent with the development of weapon systems; (5) laying the foundation now for the technical skill base required for tomorrow's defense needs ; and (6) ensuring that

industrial base issues important to our defense benefit from the full spectrum of potential policy remedies, when appropriate.

Forging the Right Relations With Industry

Conclusion

The Department of Defense ability to meet the materiel needs of our security objectives relies on the private sector and is being impeded by an exaggerated adversarial relationship. Lack of trust on both sides, perhaps fully justified, creates an environment in which significant improvements are increasingly difficult.

Discussion

Regardless of the source of distrust, there is a powerful need to build a cooperative relationship between the Department of Defense and industry that will lower barriers to improvements, enable more effective policy development and implementation, and contribute to the national goal of a strong industrial base.

This could be accomplished by creating a mechanism that would contribute to better understanding and consistency of effort by enabling senior industry managers (while avoiding any possible conflict of interest) to participate in the analysis of priority issues and alternative solutions.

Two bodies, a Manufacturing Advisory Council and a Defense Manufacturing Board might function in similar ways, but in different environments. The Manufacturing Advisory Council's activities would be focused on public policy issues and national economic issues relating to manufacturing, and would provide the Department an essential linkage to civilian issues, programs, and policy options in these areas.

The Defense Manufacturing Board would be established within the Department as a permanent entity, with a permanently assigned secretariat, or staff. Its functions would be keyed directly to defense manufacturing issues and problems. A key function would be to provide visibility to manufacturing and industrial base issues within the Department of Defense.

Recommendation

The Department of Defense should immediately begin to establish a non-adversarial means of communication between industry and the senior policymakers of the Department. Potential means to this end include establishment of:

- a. A Manufacturing Advisory Council, sponsored by the National Academy of Sciences, an objective third party, and;
- b. A Defense Manufacturing Board, an internal organization (modeled, perhaps, after the Defense Science Board).

Strategic Planning Task Force

Conclusion

The implicit strategy of the Department of Defense for addressing industrial base issues has been to conduct ad hoc studies of current problems. While individually important and useful, they have not been sufficient to resolve problems stemming from occasionally conflicting regulations, laws and directives, and inconsistent attention and resources dedicated to industrial base issues. The result has been insufficient resource allocations, confusion and lack of effectiveness in solving industrial base problems.

Discussion

A coherent, effective organization is required now to coordinate and provide oversight of ongoing industrial base initiatives and, more importantly, to do the necessary planning and organization work required to establish permanent institutional mechanisms.

Recommendation

The Department of Defense should ensure a viable industrial infrastructure is maintained to provide military materiel in the quantity and quality required during peacetime and for emergencies. Specifically, the Department should develop industrial strategic plans explicitly linked to military operational plans. The goal should be to identify and address actual and potential shortfalls systematically through mechanisms that sort out the relative urgency and importance of technological and industrial requirements against a backdrop of military planning scenarios and objectives. The Department should provide for a continuing assessment of both the short and long-term defense industrial base capabilities along with a clear enunciation to industry of what is needed from the industrial base and when.

The Department of Defense should immediately establish a task force under the direction of the Under Secretary of Defense (Acquisition), staffed with specialists from the Office of the Secretary of Defense, the Military Departments, and the Organization of the

Joint Chiefs of Staff, to expedite implementation throughout the Department of these and other actions identified in the report. Among other things, the task force should:

1. Develop and staff a Departmental policy statement regarding defense industrial strategic planning in support of military operational plans.
2. Determine the organizational structure, staffing and budget necessary to institutionalize the defense industrial strategic planning function in support of military operational plans.
3. Establish senior level liaison with selected allies, American industry, and appropriate civil agencies such as the Departments of Treasury, State and Commerce.

Production Base Advocate

Conclusion

The system that has been erected over decades by both the Department of Defense and the Congress to obtain the materiel necessary for our security could be improved to accomplish more effectively the objectives of providing the military with appropriate technologies, within reasonable time periods, at reasonable cost, and of yielding outstanding quality products that can be produced in time and in the necessary quantities to satisfy potential emergencies.

Discussion

The laws and regulations under which Defense acquisition programs function are, by any measure, a *hodge-podge* which has evolved over several decades. A substantial portion of the entire body of rules was put in place in response to specific occurrences of poor management or wrong doing, and is intended solely to ensure that these occurrences *can never happen again*. Typically, such remedial actions initially were not evaluated for soundness and feasibility of implementation, nor have they been subsequently evaluated. There is a compelling need for institutional means, such as a Production Base Advocate, to test objectively the soundness and impact on industrial efficiency of existing and proposed laws and regulations, as well as the means to develop and test innovative alternatives to such laws and regulations.

Key characteristics of the office of Production Base Advocate should include:

- A small, but highly qualified staff, headed by the Department's Production Base Advocate. Other staff members would be drawn from the Military Departments and Defense Agencies, in the same manner as for other joint program offices;
- Annual budget authority to support tests of innovative manufacturing and industrial base programs;
- A board of advisors, with membership from industry, academia, and other Government organizations (the Manufacturing Advisory Council and/or the Defense Manufacturing Board could fulfill this function).

The Production Base Advocate should have broad authority to deviate from acquisition regulations (both legislative and administrative based) in the process of conducting experimental programs to improve Department of Defense management.

Recommendation

The Department of Defense should establish an office of Production Base Advocate, an institutional structure to receive, evaluate, and test innovative ideas for improvement of Department of Defense manufacturing programs.

Analytic Capability to Develop Defense Perspectives

Conclusion

The Department of Defense has not had adequate institutional mechanisms for maintaining awareness of either technology or industry trends, nor for understanding, analyzing, or assessing the national and international issues that surround the questions of American technological or industrial competitiveness.

Discussion

In order to guide defense policy more effectively, the Secretary of Defense and the Under Secretary of Defense (Acquisition) require coherent, dedicated data acquisition and analysis support not currently available to them. In developing this capability, the Department should recognize existing programs which might be adapted to address this shortfall. Two such programs, the Defense Industrial Network and Project SOCRATES, that are now in their formative stages, are being established to deal with specific problem areas in manufacturing and technology, but might economically be adapted to fill this need.

Recommendation

The Department of Defense should establish permanent, institutional mechanisms to acquire, analyze, and assess manufacturing and technology data and provide the principal officers of the Department cogent, objective advice with respect to defense issues that involve the performance of the United States industrial base. The Defense Industrial Network and the Defense Intelligence Agency's Project SOCRATES should be merged and adapted to fill this requirement for data.

Foreign Dependencies

Conclusion

From the national security perspective, foreign dependencies in technologies essential to defense production are inherently risky, and minimizing them should be a Department of Defense and national priority. However, there is at present no reliable system even to identify such dependencies, not to mention systems to minimize them. Especially in critical lower-tier industries which support defense prime contractors, visibility is key to maintaining the ability to assess the consequences of foreign-sourcing and evaluate the implications of the potential loss of leadership in key technologies.

Discussion

The Department of Defense does not know the extent to which foreign-sourced parts and components are incorporated in the systems it acquires. There is no systematic, established means to identify foreign-sourced parts and components and, hence, no way to determine the extent of foreign dependencies or vulnerabilities. There have been a number of *ad hoc* efforts that have identified specific foreign dependencies and preliminary indications that foreign dependencies are increasing. In a national emergency, the consequences of extensive dependence on foreign sources could be extreme.

More immediately, however, an apparent consequence is that we are experiencing the loss of technological leadership in key manufacturing technologies at an increasing rate. This has extremely adverse potential for our long-term security interests.

Recommendation

The Department of Defense should develop and implement systems to provide visibility of critical foreign-sourced items in or proposed to be in new weapon systems, prior to the demonstration/validation decision milestone during the acquisition decision making process.

Factory Modernization Investments

Conclusion

Defense acquisition programs are not conducted in a normal market environment, and the absence of normal market incentives is a barrier to contractor investment. In the absence of normal market incentives, the Department of Defense has developed alternative programs, primarily a rigid set of procurement rules and regulations. There are aspects of these Departmental procurement policies and regulations that impede investments for increased productivity. The Department's Industrial Modernization Incentives Program, designed to stimulate contractor investments, must be administered within this contrary environment and, therefore, is not as effective as it otherwise might be.

Discussion

Some Department of Defense policy-related impediments to investment have existed for many years. Among these are:

- Cost-based production contracts, which not only fail to reward contractors for reducing costs, but often actually penalize reduced costs by also reducing profits. In effect, the most efficient contractor earns the least profit and, conversely, the least efficient earns the most;
- Emphasis on low acquisition cost and schedule compliance, to the virtual exclusion of low life cycle costs and producibility and reliability considerations.

Others of more recent origin pose even greater threats to the long-term efficiency and productivity of the defense industrial base:

- Increased emphasis on price competition, which forces shortcuts and reduces incentives for investments in new equipment and quality systems;
- Intense pressure on profits — down to levels that virtually guarantee contractors will have limited ability to invest in future productivity programs or high-quality people;

- The absence of risk-sharing for innovation;
- Emphasis on forcing contractors to fund (and assume risk for) program-specific tooling and test equipment.

In the short-term, such policies and practices may result in reduced program acquisition costs, which is their intent, but in the long-term, they may be counterproductive if they accelerate the decline of the defense industrial base.

Recommendation

The Department of Defense should assign high priority to resolving the issues of incentives for productivity enhancing investments by defense contractors and to creating an environment more conducive to successful administration of the Industrial Modernization Incentives Program. This task will require detailed analysis of the effects of virtually every aspect of defense acquisition policy, much of which is mandated in law. This substantial undertaking may be an appropriate high priority task for the Production Base Advocate, assisted as required by the Manufacturing Advisory Council and the Defense Manufacturing Board.

Program Stability

Conclusion

There is little doubt that program and process instability and uncertainty are extremely detrimental to defense acquisition and manufacturing management. Much of the instability and uncertainty clearly is attributable to lengthy budget and program decision processes within the Executive Branch. Equally clear, much of it is attributable to congressional micromanagement, not just of defense programs, but of small details of the acquisition management process. It is unlikely that major improvements in defense acquisition and manufacturing management will be achieved in the absence of greater predictability, stability, and certainty in programs and the acquisition process.

Discussion

Both Congress and the Department of Defense contribute to an environment which is inimical to good manufacturing practices and cost containment, and which is a strong impediment to investment by defense contractors. Elements of the environment include constant budget turbulence, small-volume programs, year-to-year program uncertainties, program *stretch outs*, changes in the rules of contracting (competition, military requirements, allowable profits, audit standards, etc.), late appropriations, and uncertain congressional continuing resolutions. These great uncertainties by themselves are sufficient to motivate defense contractors not to invest in productivity improvements. They also serve as strong impediments to highly qualified commercial manufacturing firms entering the defense market; and in some cases, they have been primary causes of firms leaving the defense market.

Recommendation

The Department of Defense must support and make better and more extensive use of programs already available (or potentially available) to stabilize major acquisition programs. These include two-year budget cycles, multi-year contracts, and a more realistic (achievable) five-year program. There also must be incisive analyses of programmed and budgeted development and production rates specifically focused on the issues of manufacturing efficiency and cost, contractor incentives for investment, and long-term impact on industrial capacity and capability.

Life Cycle Costs

Conclusion

The most effective measure of the value of a weapon system is based not on its initial acquisition cost, but on the total costs over its entire fielded life. Effective, universal use of true life cycle costing techniques is an imperative if the Department of Defense is to acquire the most effective and reliable systems at affordable overall costs.

Discussion

The concept of life cycle costing provides the most sound basis for effective evaluation of proposed weapon system research and development and production programs. However, life cycle costing is not often used effectively in the evaluation and source selection processes. Program managers and source selection teams often focus overwhelmingly on up-front costs and schedule considerations in evaluating proposals. Budget pressures are an obvious cause of these priorities, but there are other, perhaps equally important, causes.

Department of Defense personnel are uncomfortable with the inherently uncertain down-stream costs implied in the issues of how reliable a system is and how easily it can be maintained and used, as they are reflected in contractors' projections of requirements for human resources and training, support equipment, spare parts, etc. Even after the fact, the Department has no adequate means to monitor and evaluate actual versus projected life cycle costs and, hence, has no means to gain added confidence in future evaluations of contractors' projections of life cycle costs. One consequence is that the Department of Defense rarely assigns any weight to contractors' reputations for producing reliable, high-quality, low-maintenance systems, because it has little ability to do so.

Recommendation

The Department of Defense should raise the priority of using life cycle costs as a basic evaluation technique in acquisition programs. An assessment should be made of the progress of the Department of Defense in applying this concept. More research should be conducted to achieve a better understanding of the concept and how it can be exploited for the Department's benefit. Specific procurement experiments should be conducted to explore how the use of life cycle costing can be developed to reduce overall costs of weapon systems.

Quality Control

Conclusion

Current Defense Department acquisition management systems and procedures do not adequately recognize the importance of effective quality control programs in contractors' plants nor do they provide sufficient incentives for contractors to invest in such programs.

Discussion

In other countries, most notably Japan, techniques and processes for achieving consistently high quality manufactured products have progressed much more rapidly and have been more widely adopted than in the United States. Within the United States industrial base, firms in the defense sector have lagged even further behind. To some extent, Department of Defense acquisition and management practices are causes of the reluctance of defense contractors to adopt advanced quality control programs. Department of Defense practices, which have been characterized as *inspecting quality in*, do not recognize or adequately reward contractors who achieve effective quality control and, hence, provide little incentive for them to do so.

Recommendation

The Department of Defense should develop an effective *quality first* program, and dedicate the resources required to implement such an effort. An effective program will require, among other things, basic changes in emphasis in source selection criteria and procedures and extensive training of Department of Defense personnel in modern quality control systems and processes.

Commercial Specifications and Processes

Conclusion

Department of Defense programs might benefit greatly from increased use of commercial specifications and, especially in the lower tiers, from increased use of the same resources (design, engineering, production facilities) to manufacture both military and commercial products. Potential benefits include reduced lead times, reduced costs, improved quality and reliability, and increased responsiveness to meet surge and mobilization requirements.

Discussion

The separation in the industrial base between defense and commercial production is nearly absolute. There are few examples of firms that produce both military and commercial products in the same plants. There are firms that serve both markets, but they invariably maintain rigid separation between the two lines of business. These firms, however, do have a more informed view of the difficulties involved in attempting to integrate production of military and commercial products. Their perceptions are that barriers to integration range from the immense burdens imposed on defense contractors by Government rules and regulations (including, for example, cost accounting standards which require defense contractors to keep two sets of books) to the unique requirements of thousands of detailed process and product specifications (which frequently are obsolete by the time they are promulgated). In many product and process technologies, commercial practice has surpassed defense practice, with the result that the Department of Defense often pays more for less advanced products.

Recommendation

The Department of Defense should vigorously pursue efforts to increase use of commercial manufacturing process and product specifications, in lieu of unique military specifications. The Department also should comprehensively identify barriers to integrated manufacturing of commercial and military products and examine alternative practices which might facilitate such integration.

Emphasis on Process Technology

Conclusion

American manufacturers, in many cases, are unable to get products from research and development into the market as fast as is necessary to be competitive. There are many examples where American manufacturers are unable to develop and apply new process technology in their operations as fast as their international competitors. In the defense sector, the Department of Defense Manufacturing Technology Program is the only existing program focused specifically on development of advanced manufacturing process technology.

Discussion

The Department of Defense Manufacturing Technology Program has contributed greatly to the advancement of generic manufacturing science and technology, but even more productive results could be achieved with greatly expanded and more predictable levels of resources. The Department of Defense also must find specific means to integrate concurrent product and process technology development into research and development programs and the acquisition life cycle. One way would be to require concurrent development of efficient, cost effective manufacturing capability as part of all research and development efforts. Among the measures that could be pursued is a contract clause tailored to each research and development effort to require development and demonstration of the ability to produce the product.

Recommendation

The Department of Defense should develop a comprehensive program to ensure development and application of effective, advanced process technologies concurrent with basic science and technology programs and weapon systems development programs. The program should have four major thrusts: (1) development of manufacturing technology as part of all basic science and technology programs; (2) development of manufacturing technology in all weapon systems development programs; (3) changes in policies governing contractor independent research and development/bid and proposal costs to stimulate emphasis on manufacturing technology and, (4) greatly expanded emphasis and resources for the Manufacturing Technology Program.

Technological Skill Base

Conclusion

The quality of the nation's technological skill base is an indicator of the future prospects for American industrial competitiveness. The source of the technical skill base is our university system. While the quality of the system is sound (and it remains a national competitive advantage when compared to the rest of the world), there are some areas of concern.

Discussion

Much of the discussion about technical education focuses on funding, but the issue is equally one of national leadership. The nation must build its technological skill base if it is to achieve the goals of security and well being of its citizens. Current data suggests that foreigners may be utilizing our graduate technical programs more than we are (85 percent of the recent growth in graduate education has been from foreign students often on state subsidy and/or Federal Government grants). Coupled with demographics that will reduce the pool of potential scientists and engineers, there is a growing problem that can be altered only by national leadership.

The effort should include all Federal agencies with technical missions, including the National Aeronautics and Space Administration, the Department of Energy, and the National Bureau of Standards of the Department of Commerce. National political and business leaders should be involved with a multi-media approach to achieve a national consensus for support. Industry should be stimulated to assist with the effort in local and regional programs, seminars, cooperative education efforts, and, particularly, with attractive technical career path opportunities.

Recommendation

The Department of Defense should lead the organization of a national program to stimulate enrollment in both undergraduate and graduate technical programs to assure both the quantity and quality of technically qualified graduates necessary for national success. A specific objective should be to raise the prestige and attractiveness of technical careers, with particular emphasis on manufacturing.

Incentives for Technical Education

Conclusion

The Department of Defense, perhaps more than any other agency, depends on technology as its lifeblood. The Department has a direct stake in the quantity and quality of science and engineering graduates. Efforts must be made to reverse the decline in numbers and capabilities of technically educated personnel.

Discussion

The Department of Defense might offer scholarships at schools willing to build world-class manufacturing engineering programs. Selection of the schools would be based upon:

- Industrial commitment to maintain leading edge university expertise;
- Industrially supported faculty positions to enable the world's best manufacturing managers to teach future generations;
- Industrial hiring programs to assure that the finest career opportunities are afforded the new generation manufacturing manager;
- State and university commitments for faculty and curriculum development to ensure America remains on the leading edge of the development and management of technological progress.

Recommendation

The Department of Defense should combine a scholarship program in manufacturing engineering with a plan to build university expertise in manufacturing. The program should be developed jointly with industry.

Educational Facilities

Conclusion

State-of-the-art education facilities represent another deficiency in American universities for teaching manufacturing-related science and engineering skills and, hence, provide another impediment for students and faculty alike to pursue manufacturing careers.

Discussion

An instrumented factory program might competitively award grants for a number of advanced manufacturing technology demonstration centers to universities or non-profit coalitions of manufacturers, equipment suppliers, material suppliers, and other appropriate organizations. Each center would consist of an instrumented factory that produces limited quantities of military items, using the latest available state-of-the-art manufacturing technologies. The program would provide for conducting Government-funded research and development associated with the processes used in the factory, encompassing the physical, data, control, and human factors. Mechanisms would be required to ensure that the technologies are promptly implemented in private companies.

Recommendation

The Department of Defense could provide seed money for an instrumented factory program for industries where there are large numbers of companies and significant non-defense applications.

Production Base Impact Assessment

Conclusion

There is a need for focused, coherent analysis of issues affecting American manufacturing industries.

Discussion

United States law and policy historically have been developed primarily in response to domestic requirements, with little attention given to the possible harmful effects they may have on the health, vitality, and long-term survival of American manufacturing industries in an increasingly competitive international environment. Explicit assessments of the effects of legislation and regulation on the health and vitality of our production base should be conducted prior to their promulgation.

Recommendation

The Department of Defense recommends establishing a substantial analytic capability within the Legislative Branch dedicated exclusively to objective analysis of the impact of existing and proposed legislation on the United States manufacturing base and its ability to compete internationally.

Coherent Tax Policies

Conclusion

Direct, indirect, and hidden taxes on the United States manufacturing base are, by current world standards, not conducive to investing at the required levels to achieve and sustain world leadership in advanced technologies and manufacturing processes.

Discussion

Efforts to achieve equitable tax policies domestically have resulted in a substantial shifting of tax burdens from individuals to industry. Especially troublesome to many American manufacturing firms is the fact that the tax burden on industry is fully reflected in the costs of domestically manufactured products, but not in the costs of foreign-manufactured products sold in the American market, even though alternative tax structures to equalize the tax burden across all products are permitted under the General Agreement on Tariffs and Trade.

Recommendation

The Department of Defense advocates and supports the concept that there should be a comprehensive analysis of tax policies specifically focused on enhancing the international competitiveness of American manufacturing industries. The Department of Defense recommends that the President and the Congress jointly cause this comprehensive analysis to be undertaken as a national priority.

Coherent Trade and Domestic Policies

Conclusion

Many other elements of Federal law (antitrust, environment, safety, etc.), other than the tax code, also affect the operations and costs of manufacturing in the United States. In many cases, such laws are unique to the United States and, therefore, represent unique financial burdens on domestic manufacturers.

Discussion

Trade policies, as well as elements of domestic policies (antitrust, etc.) are significant determinants not only of the level of resources that are or can be devoted to defense, but of the productivity of the industries supporting our defense. From the perspective of security policy, the Department of Defense believes that in formulating trade policies, within the framework of international agreements, attention should be focused on the impact such policies have on American competitiveness and stimulating a productive manufacturing base. Domestic policies also should be examined from this perspective.

Recommendation

The Department of Defense advocates and supports the concept that there should be a comprehensive analysis of trade policy and domestic policies, specifically focused on enhancing the international competitiveness of American manufacturing industries. The Department of Defense recommends that the President cause such fundamental examinations to be undertaken as national priorities.

Education and Training

Conclusion

There is substantial evidence that the basic skill levels of many American high school graduates are not adequate for the needs of manufacturing firms. At the university level, curricula does not adequately focus on manufacturing processes, technologies, or management. Continuing education programs for professionals and workers alike are inadequate or nonexistent in most American firms.

Discussion

The Department of Defense is dependent upon a continuing flow of highly qualified mathematicians, scientists, engineers, and technicians, as well as an adequate supply of skilled, motivated line workers in manufacturing processes and maintenance programs. Shortages in these areas create market distortions, which disrupt development and production schedules, reduce quality, and increase costs. Education and training are the most fundamental long-term national priorities in the effort to sustain an advanced industrial economy and to provide adequately for our defense.

The Department of Defense traditionally has been and continues to be involved in scientific and technical educational programs, but has not recently subjected its educational programs to rigorous review from the perspective of modern industrial requirements. There also has been no recent fundamental examination of the quality or relevance of American educational systems (at all levels) specifically from the perspective of the needs of an advanced industrial economy. The combination of deficiencies in education and training at all levels represents, perhaps, the most serious long-term problem facing the United States industrial base.

Recommendation

The Department of Defense problem with respect to inadequate skill levels in the United States is a component part of the national problem. The Department recognizes that long-term basic solutions are beyond the scope of its responsibilities and capabilities and urges that there be a national effort, beginning now, to achieve these long-term solutions.

Private Sector Issues

Conclusion

Notwithstanding the continuing successes of some entire sectors of the United States manufacturing base and of individual firms in other sectors, there is a pervasive problem with the quality and effectiveness of management in American manufacturing industries.

Discussion

The findings of this study are, collectively, an indictment of management in American manufacturing firms. This is a particularly sensitive problem because Government has little or no ability to address the problem or to contribute to its solution. Of course, one exception is that Government should ensure that its current practices that are intrusions into the operations of manufacturing firms do in fact impose the least possible harm on these firms. However, this should not be construed to mean Government will shirk its oversight responsibilities. A less obvious exception lies in the potential for Government to influence the expectations and actions of owners and managers through, for example, changes to tax law to discourage an excessive focus on the short-term and to provide incentives for long-term investment in technology development and implementation.

Recommendation

The Department of Defense can contribute substantially to improved management in defense firms through improved acquisition processes, selective contract incentives based on competitive cost reductions, and a concomitant effort to reduce its intrusions into management's affairs. The management problem in non-defense industries, however, is largely beyond the reach of Government agencies. At a minimum, however, unnecessary Government barriers to management motivation to achieve manufacturing excellence and competitiveness must be identified and dismantled.

POST SCRIPT

by Dr. Robert B. Costello

Under Secretary of Defense (Acquisition)

The research that formed the basis for the recommendations contained in this report was conducted over more than a year's time. As good ideas came to the fore during this period, we chose to act upon them rather than await final publication of the report on this initiative. Some of the recommendations already are ongoing within the Department. For example, one key recommendation in this report, perhaps the highest priority, is directed to forging better relations with industry. Proper cooperation between industry and Government is essential for creating a *win-win* situation for both parties and for ensuring the existence of a healthy and vital industrial base from which the Department can draw its mission requirements.

To this end, the establishment of a Defense Manufacturing Board within the Department of Defense is underway. This new Board has an approved charter, and the nomination process for members has begun. The National Academy of Sciences has agreed informally to create a Defense Manufacturing Strategy Committee, referred to in the report as the Manufacturing Advisory Council. Nominees to this Committee also have been identified. The Defense Science Board has formed a Defense Industrial and Technology Base Task Force. This Task Force will examine in greater detail the recommendations we have made on bolstering defense industrial competitiveness. These beginning efforts should provide the foundation for a more effective partnership between the Department and the industries upon which we rely and for developing innovative solutions to both the short- and long-term problems identified in the report.

Two key actions required to ensure a comprehensive, sustained effort to implement these and other new initiatives are: (1) to provide a senior-level focal point to concentrate Departmental responsibilities for industrial base programs; and (2) to acquire the factual data required to support sound industrial base plans and programs.

Efforts are actively underway to establish the new position of Deputy Under Secretary of Defense (Production Base and International Technology), who was referred to in the report as the Department of Defense Production Base Advocate. Along with its institutional responsibilities to receive, evaluate, and test innovative ideas to improve Department of

Defense manufacturing programs, the Office of the Deputy Under Secretary of Defense (Production Base and International Technology) will serve as the focal point within the Office of the Secretary of Defense to oversee and coordinate all manufacturing-related activities of the Department.

The Office of the Deputy Under Secretary of Defense (Production Base and International Technology) also will be responsible for acquiring, organizing, maintaining, and disseminating data required for defense industrial base plans and programs. This effort already has begun with the staffing of a directive merging the Defense Industrial Network and Project SOCRATES into the Defense Industrial Base Information Administration. This effort will be broadened in the near future to develop means to identify critical foreign-sourced items in current and proposed weapon systems programs.

With these two key actions underway, the foundations are being laid for establishing the comprehensive, dedicated capabilities we require to manage effectively a great many discrete industrial base programs. Many of these already are underway and will continue, but they will be placed under the general cognizance of the Deputy Under Secretary of Defense (Production Base and International Technology) for oversight, policy guidance, and Department-level management.

Educational initiatives are, in the long-term, perhaps the most significant of the recommendations contained in the report. We intend to move resolutely, but cautiously, on these: resolutely because the issue of superior technical and scientific education is critical to the nation's future; cautiously because the Department of Defense properly is limited to a support role in this issue, which involves every level of Government.

A number of the remaining recommendations relate to efforts already in place within the Department or to recent new initiatives. This, of course, does not mean that we have solved all our problems. These are partial solutions to very complex problems that will continue to require our attention and the best ideas from industry, Government, and our allies.

For example, in order to help ensure that sectors critical to our security, such as the semiconductor and machine tool industries, become more internationally competitive in manufacturing technology, the Department has provided support for the establishment of a

Semiconductor Manufacturing Technology Consortium and a National Center For Manufacturing Science.

Our Total Quality Management effort is another example of a current effort underway within the Department that is in consonance with the findings of this study. We are working to broaden the focus of quality to change the present culture of the acquisition process, contractual requirements, design and manufacturing practices, and the modern concept of quality. We hope to provide the means to change the quality culture across the Department of Defense and industry by reducing weapon systems' costs while improving their quality in the field.

We are now in the process of forming a strategic planning task force, with membership from the Office of the Secretary of Defense, the Military Departments, the Organization of the Joint Chiefs of Staff, and the Defense Logistics Agency. The principal purpose of the task force will be to establish meaningful linkages between the materiel requirements of military operational plans and the industrial base and technology programs managed by the Deputy Under Secretary of Defense (Production Base and International Technology). A substantial portion of this task already has been accomplished and provides a solid foundation for the work of the task force. The Joint Industrial Mobilization Planning Process is the analytic and assessment process used by the Military Departments, Organization of the Joint Chiefs of Staff, and Defense Agencies to perform industrial capabilities analyses for the Joint Strategic Planning System and to link industrial mobilization plans to operational plans.

Substantial progress also has been made on the recommendations for: improving incentives for producibility enhancing investments; focusing the acquisition system on life cycle costs; increasing use of commercial product and process specifications; and greatly increasing our emphasis on the development of advanced manufacturing technology.

Contact also has been made with the Economic Policy Council in the Executive Office of the President in order to begin establishing a means of exploring further the national policy issues discussed in this report.

Many other efforts are being pursued within the Department of Defense. These, in conjunction with the new ideas emanating from this study, have formed the basis for implementing this action plan to bolster defense industrial competitiveness.

Global Protection Against Limited Strikes (GPALS)

Briefing On The Refocused Strategic Defense Initiative (Edited Transcript)

12 February 1991



**Ambassador Henry Cooper
Director
Strategic Defense Initiative Organization**



**Honorable Stephen J. Hadley
Assistant Secretary Of Defense
International Security Policy**

BRIEFING AGENDA

This briefing is comprised of three parts: the changes, particularly during the last twelve months, in the strategic environment in which defenses are viewed; our conclusions regarding consequent changes in the policy framework for SDI, and funding and programmatic implications for the specifics of the SDI program.

On February 12, 1991, in the Pentagon's Press Center, Mr. Hadley discussed the emerging strategic environment and the Bush Administration's new refocused SDI policy which is responsive to that emerging environment. Ambassador Cooper discussed technical funding and programmatic aspects of the refocused SDI program. The following is edited from the transcript of that briefing, which has been broadcast nationwide on CSPAN.



PROGRAM FOCUS

Objective

- Protect Against
 - Ballistic Missile Attacks On U.S. Forces Overseas And U.S. Friends / Allies
 - Soviet And Third Country Accidental, Unauthorized And / Or Limited Ballistic Missile Attacks On The United States

**Global Protection Against Limited Strikes
GPALS**



BRIEFING AGENDA



- Emerging Strategic Environment
- New SDI Policy Framework
- Funding / Programmatic Implications

PRESIDENTIAL DIRECTION

In his State of the Union address, the President reflected a decision which he had previously made. He directed that the SDI program be refocused with the principal objective of providing protection from limited ballistic missile strikes, whatever their source. That is an important change. In addition, he emphasized that we are providing protection not only for the United States, but also for our forces and citizens overseas U.S. and for our friends and allies.



CHANGES IN THE STRATEGIC ENVIRONMENT



- **Evolving East - West Relations Changes Calculus**
 - Soviet Union Will Retain Large, Modern Strategic Forces
 - Political Instabilities Increase Concern About Soviet Use Of Ballistic Missiles
- **Ballistic Missile Proliferation A Growing Threat To U.S.**
 - Directly Threatens The Soviet Union
- **Threat Of Third Country Attacks Increasing**

REGIONAL INSTABILITY

Considering the broad strategic environment, there seems to be a likely continued prospect for regional military conflict. The proliferation of ballistic missile systems has substantially raised the stakes of those conflicts for the participants because ballistic missiles are very effective in delivering weapons over great distances. With a chemical, biological or even nuclear warhead on these missiles, the stakes obviously rise considerably.

The traditional deterrence calculation, which has been the centerpiece of the East-West nuclear equation, may be very inappropriate for these kinds of ballistic missile threats in a regional environment. We may not in such a context be dealing with a traditional rational actor for whom traditional deterrence theory is valid. Saddam Hussein has demonstrated that he is willing to subject his countrymen to a major war for territorial gain. He has used Scud missiles which are really missiles of terror rather than military utility -- and used them against populations that are not even part of the coalition arrayed against him. Indeed, rather than deterrence of retaliation having any inhibiting effect, he has been seeking to provoke retaliation from Israel.

We have seen the effect that the availability of the Patriot defenses for Israel and Saudi Arabia have made to this equation. There has been much debate about the kinds of tough choices that would be involved for the U.S. in deciding how to respond if Saddam Hussein were to use chemical warheads, for example. One of the important things about ballistic missile defenses is that they offer the prospect of relieving us of those tough choices, to give an option to respond to that kind of threat with defenses rather than by retaliation.



REGIONAL INSTABILITY

- Continued Prospect For Regional Military Conflict
- Rapid Proliferation Substantially Raises Stakes Of Regional Conflicts
- Traditional Deterrence May Be Inappropriate For Regional Conflict

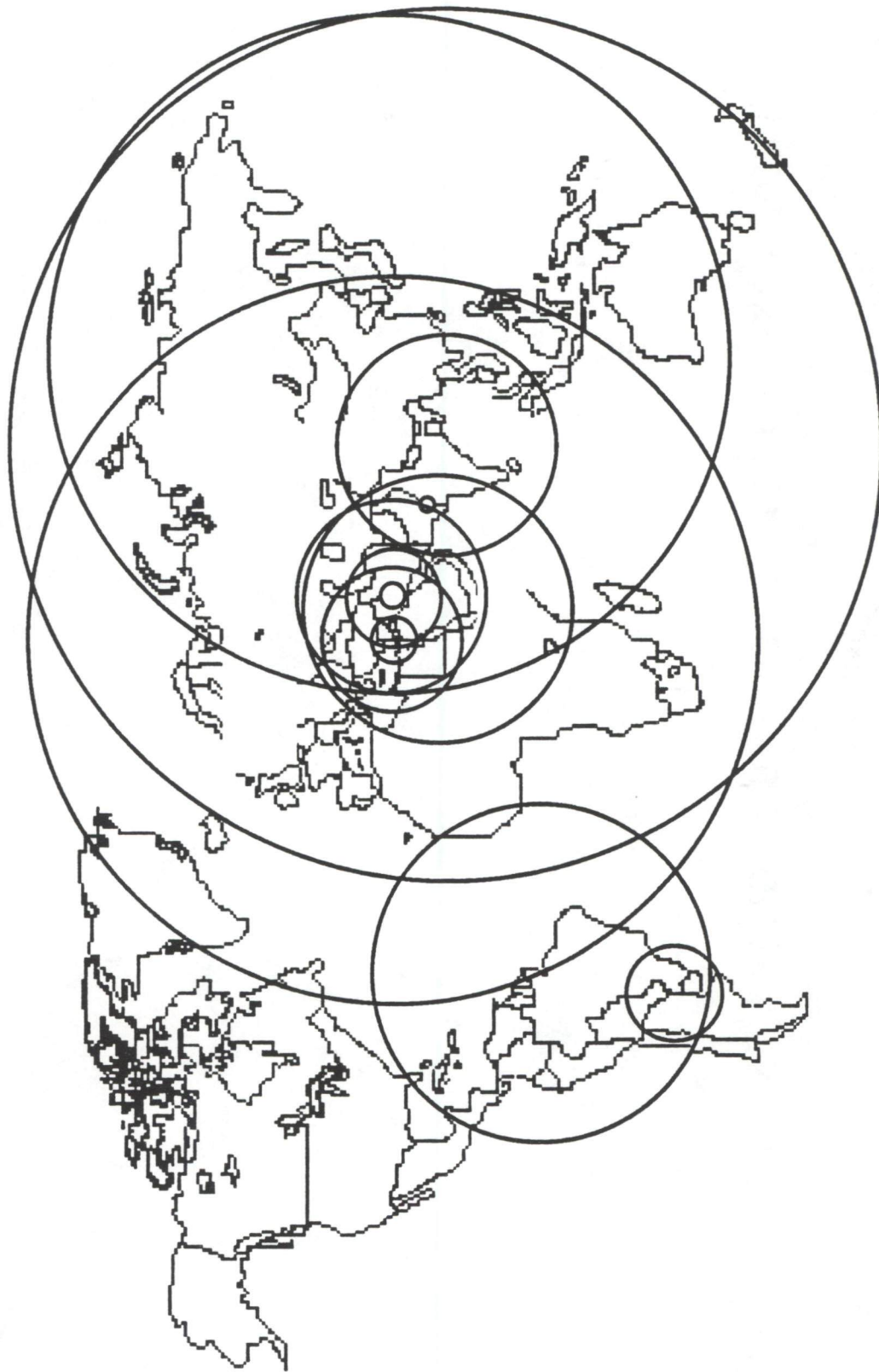
THE CURRENT THIRD COUNTRY BALLISTIC MISSILE CAPABILITY

This is an indication of the current third country ballistic missile capability which we now face, including countries which have these systems and their ranges. Many countries have ballistic missile systems now, and the number is likely to grow since a number of countries have been very willing to export these systems. Additionally, countries are increasingly developing an indigenous production capability, which means that proliferation is increasingly difficult to stop by export controls.

These systems also provide threats to some of our most important allies, and would threaten areas of the world in which United States forces need to be able to travel unhindered. This threat is more real to the Soviet Union today. That fact may provide an incentive to work a common problem which applies to both the United States and the Soviet Union.



THE CURRENT THIRD COUNTRY BALLISTIC MISSILE CAPABILITY



THE EMERGING TREND IN BALLISTIC MISSILE PROLIFERATION

The number of countries with this capability is substantial and is growing.



THE EMERGING TREND IN BALLISTIC MISSILE PROLIFERATION

(Numbers Approximate)

**Number Of
Nations**

• **Current Ballistic Missile Capability**

18

• **Ballistic Missile Capability By The Year 2000**

24

PROGRAM FOCUS

The preceding analysis has led us to a new focus for the SDI program and for our effort regarding ballistic missile defenses. We now seek a system that will protect against ballistic missile attacks on United States forces overseas and United States friends and allies. This is a new focus -- SDI is not simply about defending the United States.

Secondly, this focus also leads to a narrower program, one which is seeking protection against accidental or unauthorized, limited ballistic missile attacks on the United States as well as our friends, allies and forces overseas.

The acronym for this new revised approach is GPALS, which stands for Global Protection Against Limited Strikes. The essence of the program is to provide global protection -- not only to protect the continental United States, but protection of the entire United States as well as our forces overseas, our friends and allies. It is global, it provides protection, and it is against limited strikes.



PROGRAM FOCUS

Objective

- **Protect Against**
 - **Ballistic Missile Attacks On U.S. Forces Overseas And U.S. Friends / Allies**
 - **Soviet And Third Country Accidental, Unauthorized And / Or Limited Ballistic Missile Attacks On The United States**

Global Protection Against Limited Strikes
GPALS

THEATER MISSILE DEFENSE

One of the key elements of this refocusing is an increased priority for the theater missile defense programs. The experience with the Patriot missile in the Persian Gulf will undoubtedly focus even more attention on this priority.

Congress has supported and appropriated additional funds for this area last year. One of the objectives of the program is to focus on near-term deployment of improved theater missile defense systems. This is also an area in which we could potentially expand our current degree of cooperation on ballistic missile defense with our allies.



THEATER MISSILE DEFENSE

- Increasing U.S. Priority On TMD Programs
 - Congress Appropriated Funds To Accelerate TMD
 - U.S. Plans To Deploy TMD Systems In Near Term
- We Seek To Expand Current Cooperation With Allies
 - Build On Ongoing Cooperation
 - Theater Architecture Studies
 - Computer-based TMD Test Beds
 - Interceptor Research
 - Open To Other Avenues Of Cooperation
- If An Ally Chooses To Deploy TMD, U.S. Envisions Autonomous Systems Potentially Capable Of Interoperability With U.S. Defenses

WHY NOT GROUND-BASED ONLY?

This question regarding SDI refocusing is one which will be a matter of much debate. Why isn't Patriot enough? Why doesn't it provide the solution? Why must you go into space?

It should be clear that the issue is not space versus ground. Even with emphasis on ground systems, you need space elements, at a minimum space-based sensors, to make those systems as effective as we need and want them. So, the issue is not whether or not we will be in space. We will be in space, certainly with sensors. The issue is whether we will be in space with space-based weapons. There are some real advantages to these systems, particularly as the threat matures and improves over time.

Space-based weapons would always be in position. They could protect and offer defense against threats to forces arriving in theater before theater commanders have been able to establish their own organic theater defense capabilities. Space offers broad area coverage to protect a wide array of assets from a system based in space rather than having to protect each of those assets with their own individual ground-based systems.

Space-based weapons and the capability to deploy space-based weapons still are a key hedge against a resurgent Soviet threat and also provide incentives for the Soviets to "de-MIRV" their ballistic missiles, a longstanding United States arms control objective.



WHY NOT GROUND-BASED ONLY ?

- **Space-based Sensors Essential For Effective Defenses -- Even Ground-based Only**
- **Global Protection Against Limited Threats Requires Space-based Weapons**
 - **Always In Position**
 - **Protects Ports / Airfields For Arrival Of Forces**
 - **Broad Area Coverage**
 - **Protects Many Targets At Once**
 - **Equivalent Cannot Be Done Affordably From The Ground**
 - **Protection Of Friends / Allies Consistent With Coalition Approach To Security Threats**
- **Space-based Weapons – The Key Hedge Against Resurgent Soviet Strategic Threat, And Provides Incentive For De-MIRVing**

WHAT IF IRAQ HAD A LONGER RANGE MISSILE?

Now, this is a notional chart, constructed to explore how we could dramatize in some measure the contribution a space-based system could make to solving potential regional conflicts. This chart is to shed light on the following question: Given what we've seen the political effect of Iraqi Scuds in the attacks on Israel and Saudi Arabia, how would the dynamics of the current coalition opposing Iraq in the Gulf, and the dynamics of the current conflict, change if, at this point in time, Iraq had a ballistic missile of, say, 4500 kilometer range?

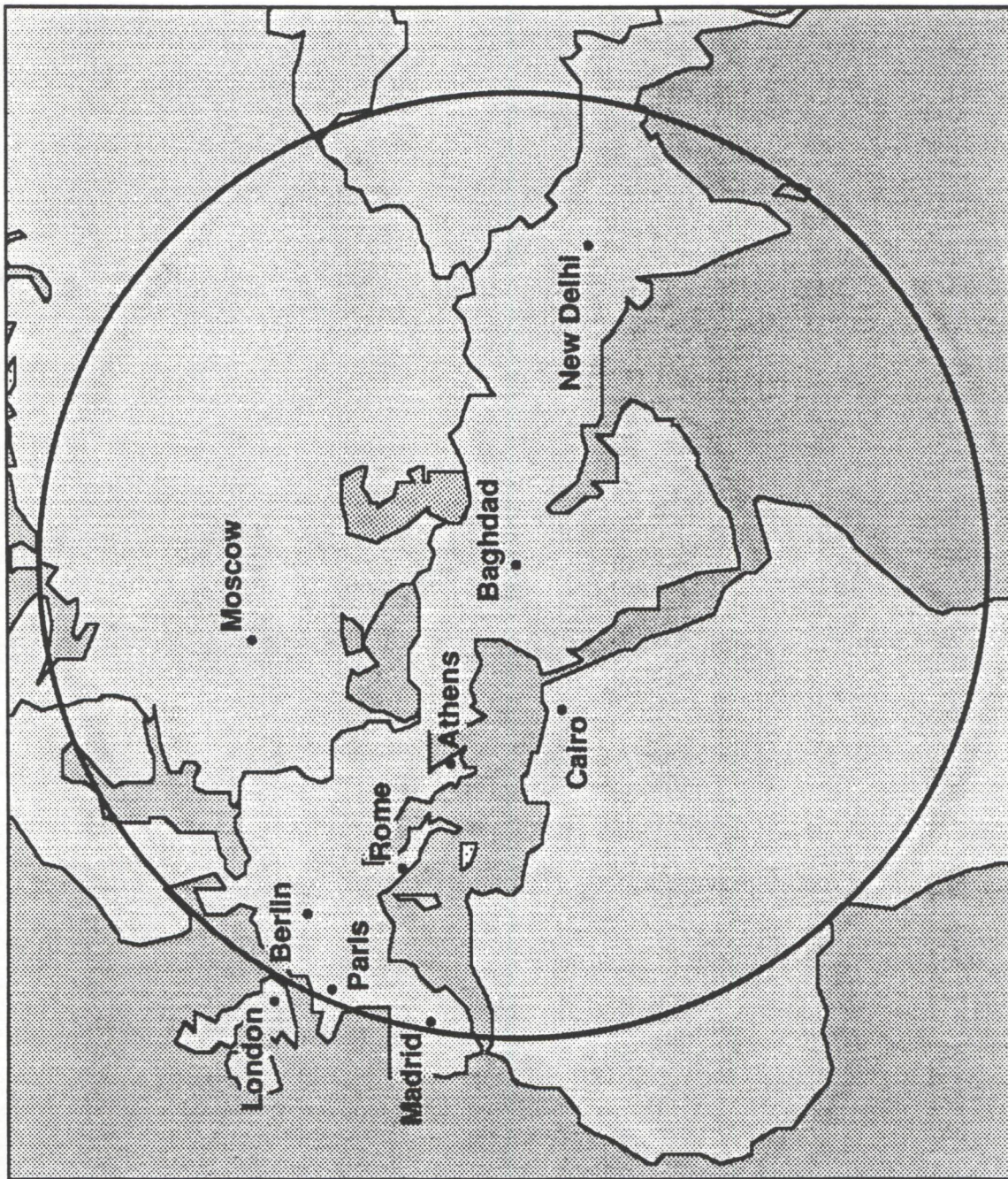
This kind of target expansion would permit Saddam Hussein to use ballistic missiles as essentially a political weapon of enormous consequences. You can see that a number of the capitals of our coalition allies would come at risk.

The point to be made is that for Patriot missiles to defend all these potential targets would be a very daunting and expensive task. However, a space-based system allows a much less expensive opportunity to protect against ballistic missiles without having ground-based interceptors to defend each of these cities -- and many others.

The political significance of this ought to be clear. If Saddam Hussein could use ballistic missiles not simply against Tel Aviv and Riyadh but against this host of relatively undefended cities, that would have an enormous impact on the current coalition arranged against him.



WHAT IF IRAQ HAD A LONGER RANGE MISSILE?



AVIATION WEEK INTERVIEW OF LT GEN HORNER

This lesson was recently elaborated by Lieutenant General Charles A. Horner, Central Command's air component commander, as quoted in a recent issue of Aviation Week and Space Technology. This is a validation of the direction we have taken in refocusing the SDI program on providing global protection against limited strikes.



AVIATION WEEK INTERVIEW OF **LT GEN HORNER**

"I Underestimated The Political Impact Of the Scud... A Lousy Weapon, A Terror Weapon"... A Miscalculation... Defused Only By The Success Of Patriot... Patriot Success Also has Exposed A Hole In The Allied Arsenal, Patriot Is A Point Defense Weapon, Areas To Be Defended In Saudi Arabia Are Concentrated In A Few, Small Clusters. If The Allied Military Targets Had Been Spread Out, There "Wouldn't Be Enough Patriots In The World To Defend" Them All.

In 15 To 20 Years, When Very Accurate Missiles With Mass Destruction Warheads Are Available To Third-World Nations, The U.S. Will Need A Regional, Wide Area Air Defense Force To Duplicate On A Grand Scale The Patriot's "Pivotal Role Of Defanging" The Scud.

***Lt Gen Charles A. Horner,
Commander, U.S. Central Command
Tactical Air Forces
Aviation Week And Space Technology
11 Feb 1991***

GPALS

The GPALS focus for the SDI program is a focus that reflects the changes in the strategic environment which we've outlined here. It is also more affordable; we believe it will be sustained by the public; and, hopefully, it will be the basis of an executive-legislative consensus to provide consistent support for the program over time.



GPALS



- **Reflects Changes In The Strategic Environment**
 - Responds To A Threat Of Increasing Concern
 - Options Remain For Expanded Missions
- **More Affordable**
- **Will Sustain U.S. Public Support**
- **Prospect For Executive - Legislative Consensus**

STRATEGIC DEFENSES FOR THE 1990s

We believe that, without question, strategic defenses are relevant to the new international security situation. Those in the technical community have long believed that they are also feasible. The fundamental issue is whether or not we will be funded and have the flexibility to exploit the opportunities that exist to demonstrate and validate these technologies -- to show that defense can be made affordable, survivable, and effective; and that they can be considerably less complex than the systems that have been put forward in the past.



STRATEGIC DEFENSES FOR THE 1990s



- Strategic Defenses Are
 - Relevant To The New International Security Environment
 - Technically Feasible
- Opportunities Now Exist In Strategic Defenses For
 - Demonstration / Validation Of Technologies
 - Further Cost Reduction
 - Increased Survivability
 - Increased Effectiveness
 - Reduced Complexity
- Strategic Defenses Can Begin To Add A New Dimension To U.S. Military Capability

WHAT DOES "REFOCUS" MEAN?

We refer to this new mission as Global Protection Against Limited Strikes, or GPALS. With GPALS, we are talking about protection against limited strikes, rather than deterrence of a massive attack.

Just to give a quantitative measure -- we mean that we want to destroy with high confidence all of a limited number of incoming reentry vehicles -- or RVs. The number may be ten to 100 or 200 RVs, and they might be delivered by ballistic missiles launched from anywhere in the world to attack areas anywhere else in the world. This mission is in contrast to the prior mission, which was to destroy a percentage, on the order of half, of a mass raid involving several thousand RVs launched out of the Soviet Union toward the United States.

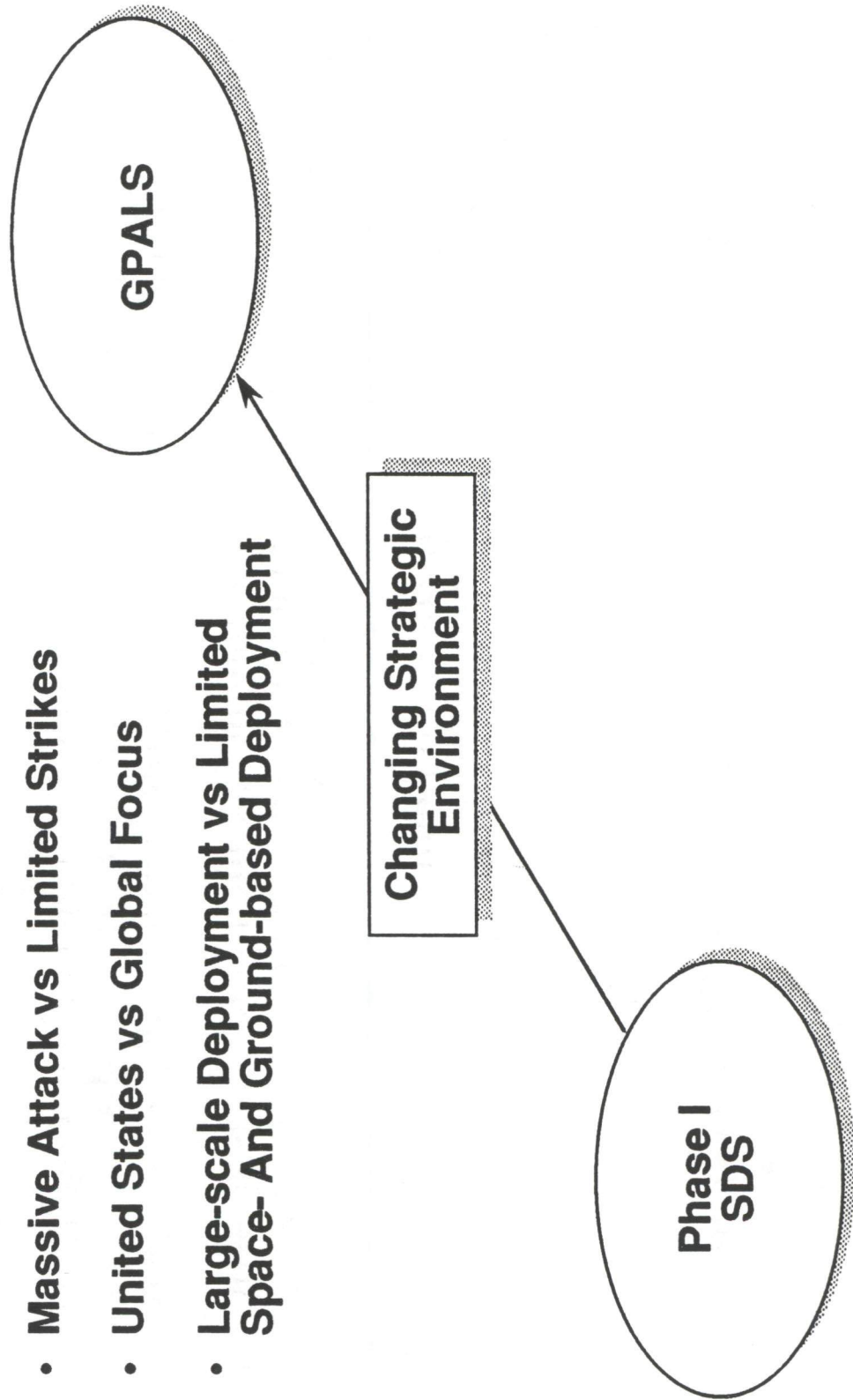
So we're talking about a focus shift from the United States, so far as the area defended goes, to a worldwide or global focus for our forces abroad, for our allies and friends as well as the American people. And we are talking about a limited deployment as opposed to a large-scale deployment of systems, both in space and on the ground, both here in the U.S. and potentially abroad.

We would also emphasize that we have changed our previous slides to refer to "the United States" rather than CONUS. We intend to provide protection for the Americans in Hawaii and Alaska as well as the other 48 states.



WHAT DOES "REFOCUS" MEAN ?

- Deterrence vs Protection
- Massive Attack vs Limited Strikes
- United States vs Global Focus
- Large-scale Deployment vs Limited Space- And Ground-based Deployment



A REPRESENTATIVE GPALS DEPLOYMENT

As a component of a representative GPALS deployment, there could be transportable defenses that could be moved into a theater or region, if and when a hot spot might develop. In some places that are continuing hot spots, such defenses might be deployed indigenously. Such an indigenous system could be the Arrow system which we are developing jointly with the Israelis. Such systems might be owned by the United States and moved into a hot spot area upon demand, or they might be owned by the allies.

The ground-based defense that would be deployed in the United States to defend against long range ballistic missiles would involve some 50 percent fewer interceptors than previously considered. It would also continue to consist of both space- and ground-based sensors.

The space-based element of the architecture, Brilliant Pebbles, is reduced by three-quarters from its original deployment level to something on the order of a thousand pebbles as opposed to in excess of 4000.



A REPRESENTATIVE GPALS DEPLOYMENT

- **Transportable Surface-based Defenses Against Theater / Tactical Ballistic Missiles**
 - **Owned By U.S. And U.S. Allies**
- **Ground-based Defense Against Strategic Ballistic Missiles**
 - **50% Fewer Interceptors Than For Phase One**
 - **Space- And Surface-based Sensors**
- **Brilliant Pebbles - Global Defense Against Ballistic Missiles With Range Greater Than Several Hundred Miles**
 - **75% Fewer Pebbles Than For Phase One**

GLOBAL PROTECTION AGAINST LIMITED STRIKES (GPALS)

— Defense Against Theater / Tactical Ballistic Missiles —

To illustrate GPALS conceptually, we have constructed a child's puzzle with three pieces. The size of the pieces reflect the relative investment in the three elements of the GPALS system. Pictured on each of the three pieces are the key components on the corresponding three elements of GPALS.

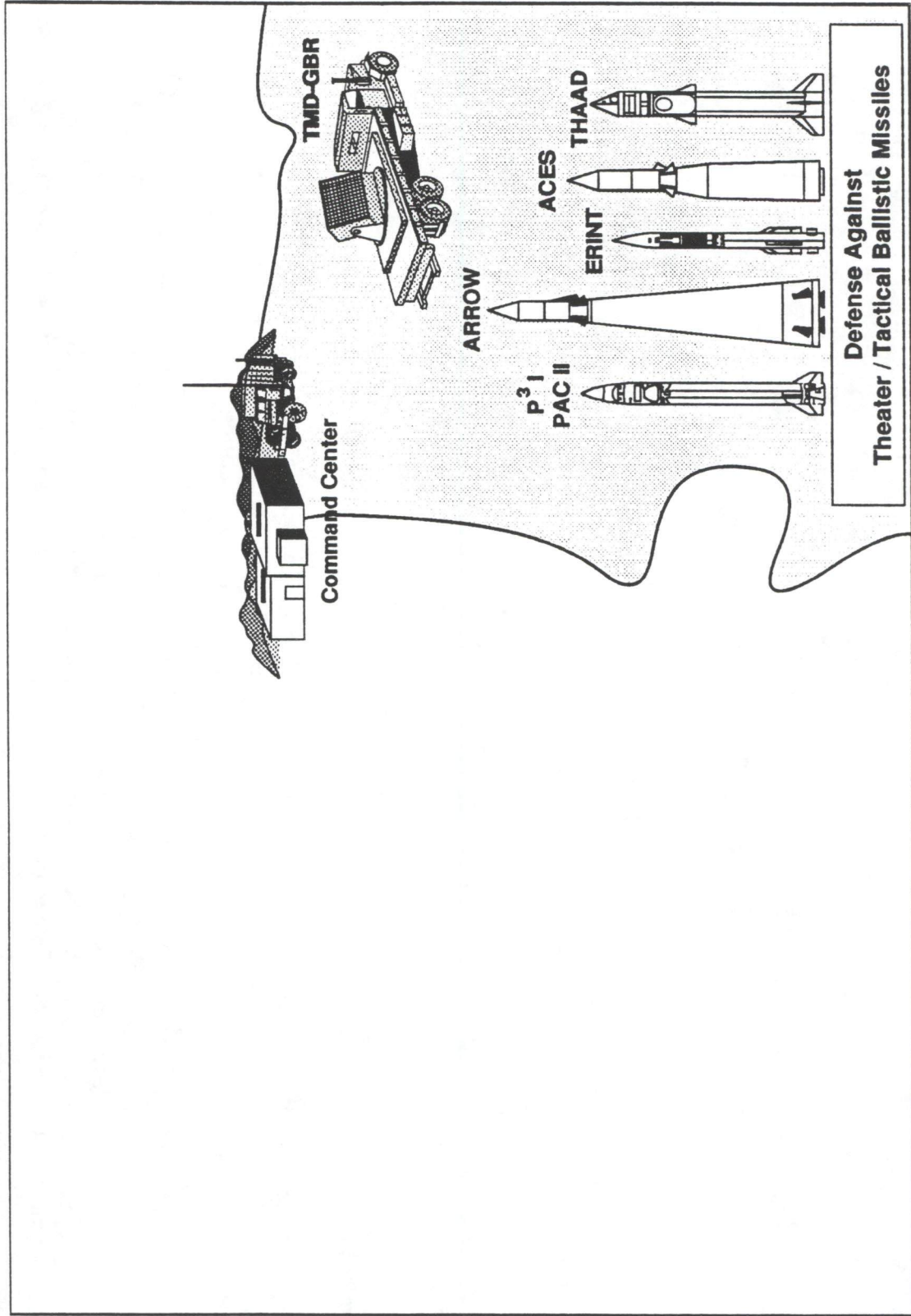
In the case of theater defense -- or the defense against the shorter ranged theater ballistic missiles -- we have programs that would begin by continuing and extending the upgrades to the Patriot system to extend its range capability and effectiveness. We will have a follow-on agreement with the Israelis to support development of the follow-on to the Arrow system referred to as ACES. THAAD is a high altitude defense that the Army has been considering in concept studies up to this point. We have accelerated that program considerably to put it into a "face off" with the Arrow program, a challenge for our industry to produce a wide area defense for theater applications by the mid 1990s.

We will continue to rely on ground-based radars. This ground-based radar, in a sense, will constitute a building block for the ground-based radar for the U.S. defense. And, of course, there is a command center element which would be associated with such a defense.

These theater interceptors could be deployed on land or on ship. There is also the possibility of airborne interceptors which might play in scenarios such as we are now experiencing in the Persian Gulf.



GLOBAL PROTECTION AGAINST LIMITED STRIKES (GPALS)



GLOBAL PROTECTION AGAINST LIMITED STRIKES (GPALS)

— Defense Against Strategic Ballistic Missiles —

The other ground-based element of GPALS is the defense against strategic ballistic missiles, to be deployed in the U.S. This ground-based system includes a satellite sensor we call Brilliant Eyes, which will play an important role in both improving the effectiveness of theater defenses as well as defenses against the longer-ranged strategic ballistic missiles.

Inclusion of such a space-based sensor system underscores a fact about space-based versus ground-based defenses. Even ground-based defenses require space-based sensors if they are to reach their potential. Even today, we are drawing upon information we get from space assets to make Patriot more effective in the Gulf.

The Ground-based Radar (GBR) is much smaller and more mobile than in the previous architecture. Its development will build on the development program for the smaller GBR employed in the theater missile defense system.

Other elements of the ground-based architecture include two interceptors designed to work on two formidable technical challenges in parallel. We have budgeted money to carry both of them through the demonstration and validation phase. Once we go into full-scale development, whether we carry one or both depends on that competition.

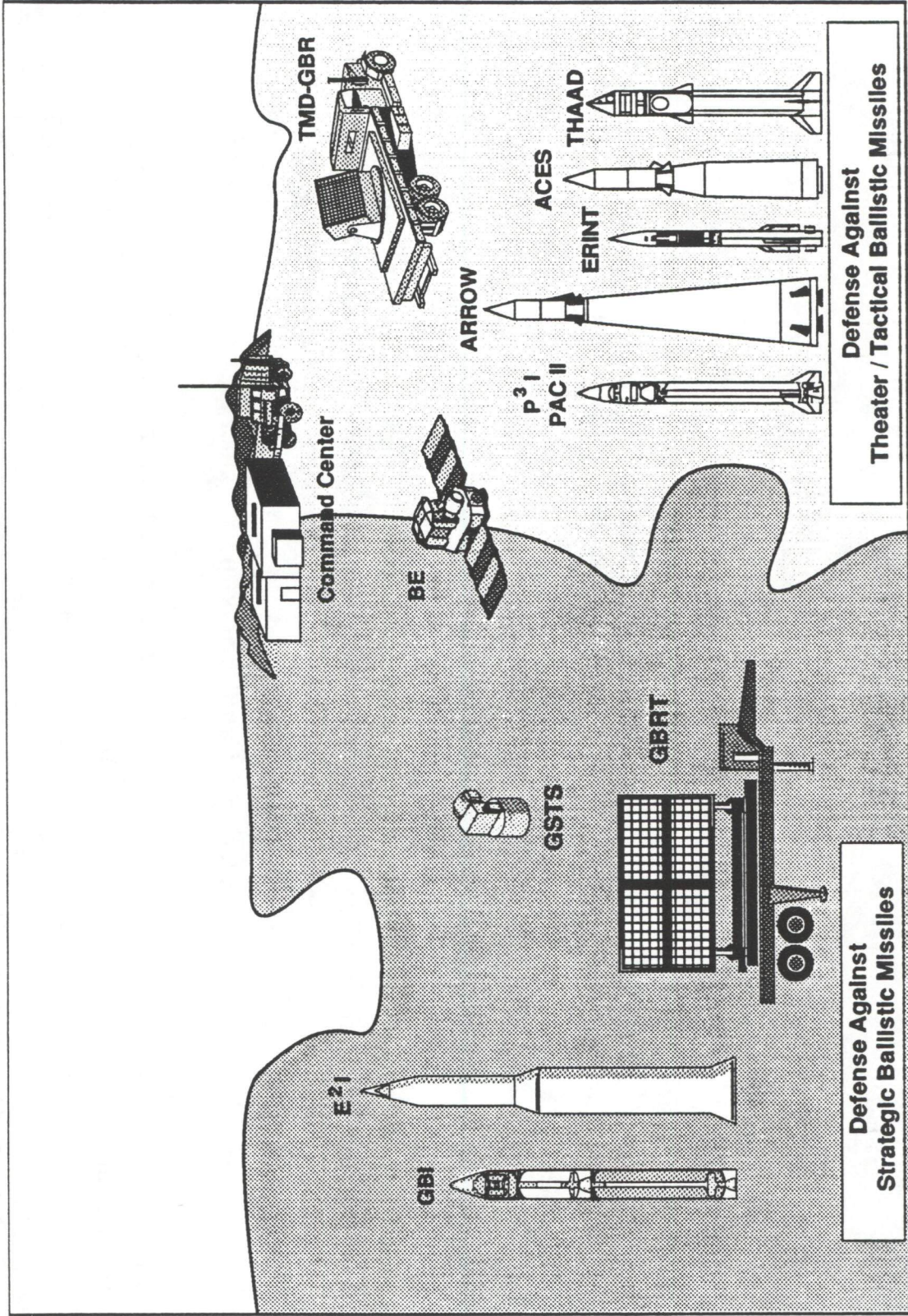
We have budgeted funds for the Exo-atmospheric Interceptor, or E²I, which is the more expensive of the two options. E²I performs its intercept high in the earth's atmosphere, after the reentering RVs can be distinguished from lighter decoys because the atmosphere causes distinct deceleration characteristics -- however, we must solve a critical engineering problem to assure that sensors will perform properly under severe atmospheric heating conditions. E²I may be the only way to solve the very tough mid-course discrimination problem, which has challenged defense designers for over 30 years, ever since we began working on this problem.

If we're able to successfully solve the discrimination problem in midcourse, then the Ground-Based Interceptor, or GBI would be the interceptor of choice, to intercept the missiles and the RVs as far away from the United States as possible. It is less expensive than E²I and would perhaps allow us to deploy a mix of both Ground-Based Interceptors and E²I. It should be noted that it may be important to have an endo-atmospheric interceptor in any case.

You will note that the size of this block is roughly twice the size of the theater missile defense, indicating roughly twice that investment.



GLOBAL PROTECTION AGAINST LIMITED STRIKES (GPALS)



GLOBAL PROTECTION AGAINST LIMITED STRIKES (GPALS)

— Brilliant Pebbles —

The final element of the GPALS architecture is the space-based interceptor portion called Brilliant Pebbles. Each Pebble is an autonomous interceptor which can act entirely on its own, once appropriately authorized. It basically looks and sees the ballistic missiles when they rise from their silos, or, in the case of the Scud, from a mobile launcher. At the appropriate time, it drops its "life-jacket" and proceeds to maneuver into the oncoming path of the threat ballistic missile -- or, during the mid-course phase, of a re-entry vehicle transiting space.

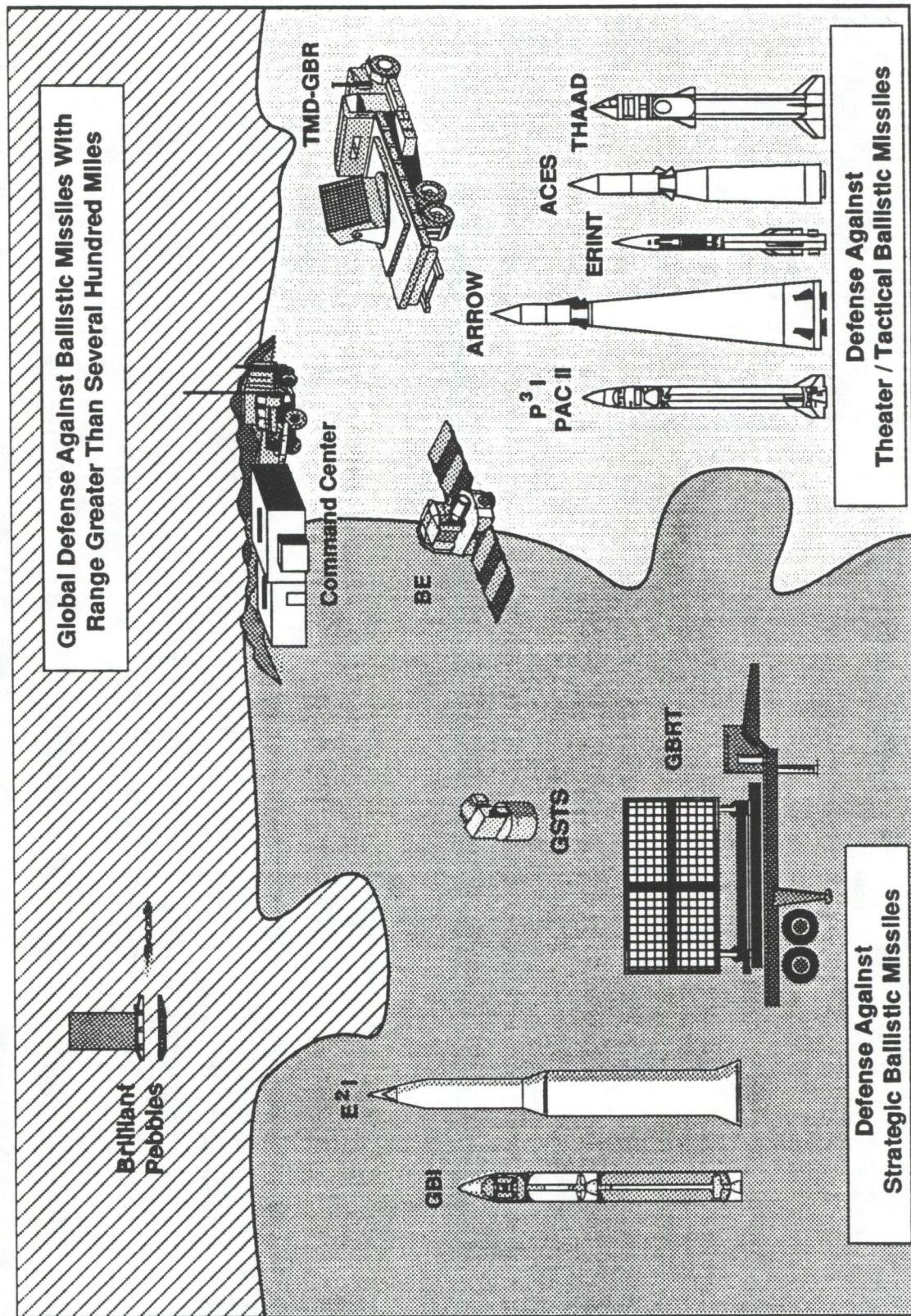
A misconception is that Brilliant Pebbles could not be employed effectively to counter theater ballistic missiles. If the range is greater than a few hundred miles, normal minimum energy trajectories would carry the RV's above the earth's atmosphere and there would in fact be time to intercept them from space using Brilliant Pebbles. If we had such a system today, it could be employed to counter the Scuds launched out of Iraq into Tel Aviv and Riyadh -- and the debris from such intercepts would probably burn-up when reentering the earth's atmosphere rather than fall on city streets.

Brilliant Pebbles is neither simply a defense for the U.S. nor for the theater. It is in fact a bridge across both. It provides a means of intercepting any ballistic missile so long as its range is more than a few hundred miles -- assuring that it reaches sufficient altitude, perhaps 60 miles, to permit an intercept in space.

The area of the Brilliant Pebbles piece of the puzzle is approximately the same as that of the theater missile defense piece -- and half that of the U.S. ground-based defense against strategic ballistic missiles. This is in proportion to the relative cost of the three elements of the GPALS system.



GLOBAL PROTECTION AGAINST LIMITED STRIKES (GPALS)



GPALS ELEMENTS - BRILLIANT PEBBLES

Brilliant Pebbles is an autonomous system. Once authorized, it looks, sees its potential targets, makes a decision on whether to engage, decides on its preferred target, and maneuvers into the path of the chosen oncoming ballistic missile. It also tells its neighbors what it is doing; its neighbors take that information into account and make their own decisions about whether to engage and against which targets. During the battle, it is not controlled by a centralized battle management system, although it must be authorized to enter the battle.

Because of its autonomous mode of operation, the Brilliant Pebbles system cannot be attacked easily. It is survivable, meeting one of the important criteria required by Congress of systems to be developed and deployed. It is also cost-effective and affordable.

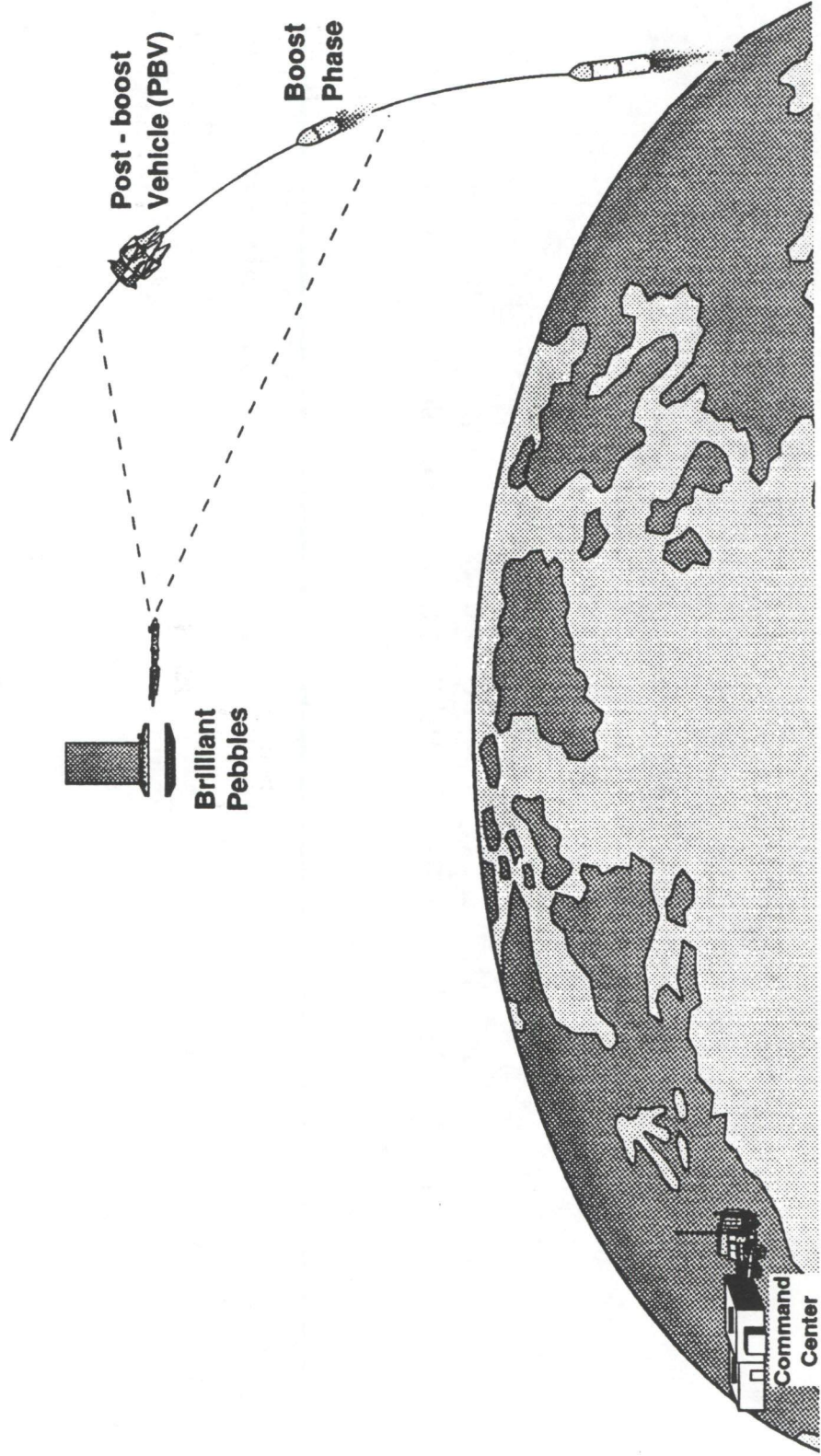
Each of these Pebbles will cost from something in the order of a million dollars, perhaps one and a half million. Launch costs could double that cost. In particular, if a Pebble were to intercept a MIRVed ballistic missile, it would clearly be less expensive than its target and certainly much less expensive than the things a MIRVed missile could attack. With systems such as the SS-25 or the shorter range missiles, Pebbles is also in the ballpark of a cost trade that is reasonable.

Research, development, testing and deployment of the Brilliant Pebbles systems is expected to cost about \$10 billion in FY 88 dollars.



GPALS ELEMENTS - BRILLIANT PEBBLES

Global Defense Against Ballistic Missiles With
Range Greater Than A Few Hundred Miles



GPALS ELEMENTS - GROUND BASED

This is an illustration of the ground-based system elements. Again, it includes Brilliant Eyes, which is an important aspect of the ground-based architecture. Brilliant Eyes begins to track the re-entry vehicles and the decoys as they are dispersed from their bus, in the post-boost phase. Because Brilliant Eyes will be closer than the previous space surveillance and tracking system to the tracked objects, they may be more effective in discriminating RVs from decoys.

As mentioned earlier there is a competition between the Exo-Endoatmospheric Interceptor (E2I) and the Ground-Based Interceptor (GBI) as to which would perform the high altitude intercept. GBI would intercept threat RVs outside of the earth's atmosphere. E2I would intercept threat RVs inside of the earth's atmosphere. Which interceptor we would lead with would depend on whether we're better at working the discrimination problem or the atmospheric heating problem (to assure we can see the RV's as they reenter the earth's atmosphere).

The Ground-based Surveillance and Tracking System (GSTS) is an Army system. It is a sensor launched on a probe, which will be used to fill in gaps in coverage that might exist or possibly as key system element of a GBI-only (ground based interceptor-only) system.

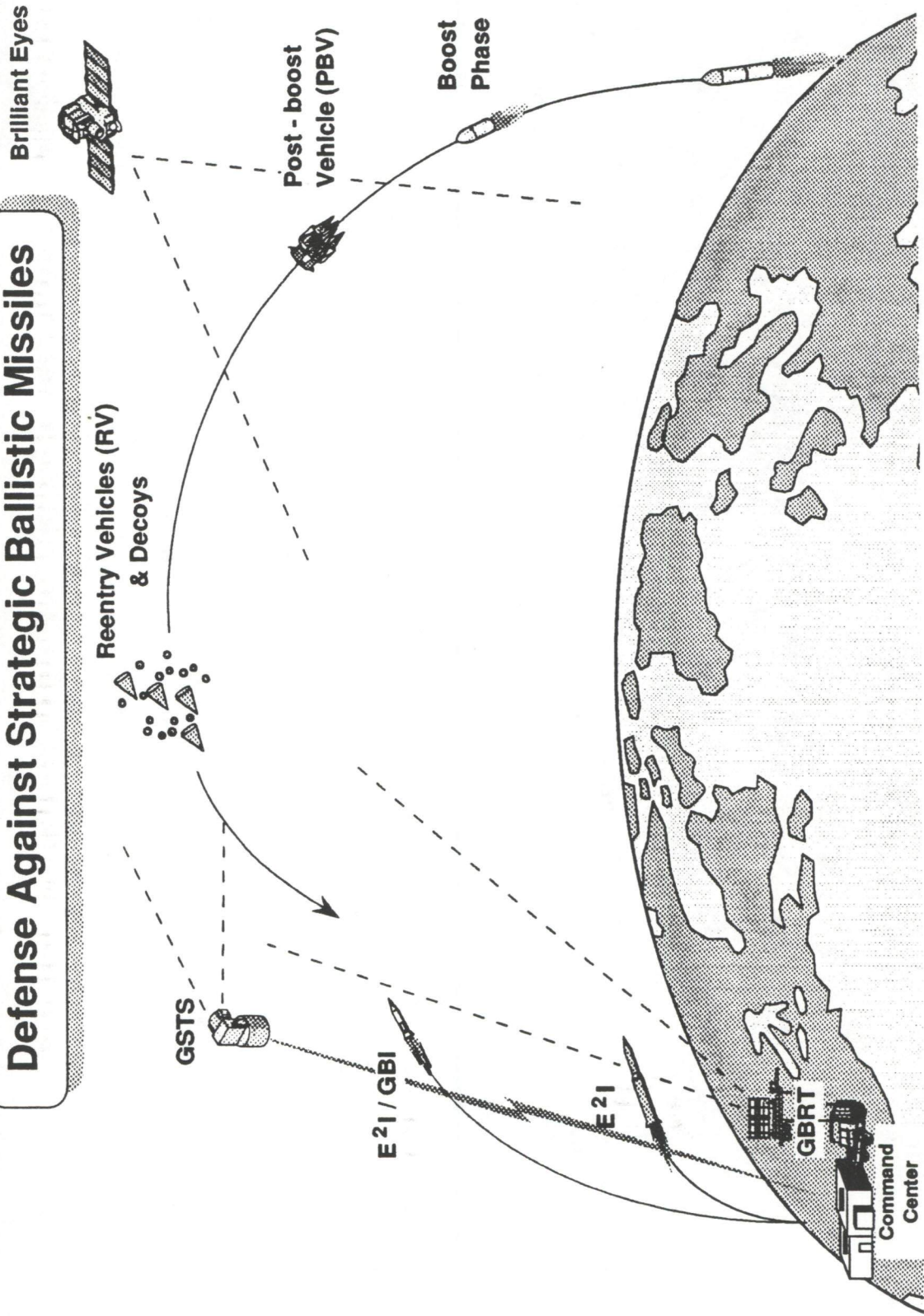
Research, development, testing and deployment of the U.S. ground-based defense against strategic ballistic missiles is expected to cost about \$22 billion in FY 88 dollars.



GPALS ELEMENTS - GROUND BASED



Defense Against Strategic Ballistic Missiles



GPALS ELEMENTS - STRATEGIC

This chart illustrates all the components of the U.S. defense architecture against ballistic missiles with ranges greater than a few hundred miles that might be launched against the United States. It illustrates dealing with an SLBM. You will note that E2I permits a low-altitude intercept. This is important in protecting against submarine-launched ballistic missiles, which can be launched on short time-of-flight, or depressed, trajectories from relatively near our coasts. If we wish to defend key target areas, it may be important to have a low-altitude, endo-atmospheric interceptor.

Research, development, testing and deployment of these system elements, which compose the traditional SDI architecture albeit of reduced size for GPALS, is expected to total about \$32 billion in FY 88 dollars.



GPALS ELEMENTS - STRATEGIC

Brilliant Eyes



GSTS



E²I / GBI



SLBM



E²I



GBRT



Command Center



Brilliant Pebbles

GPALS ELEMENTS - THEATER

These are the key GPALS elements that could provide defensive capabilities in a theater or regional conflict.

The chart also shows a possible ground-based interceptor launched from land as well as from a ship. The Navy has an extraordinary air defense and missile defense for the fleet. An interceptor compatible with that indigenous capability could be very useful -- and our architecture studies with the Navy are considering such options. The Air Force is also considering the possibility of launching interceptors from tactical aircraft. We have budgeted about \$9 billion (in FY 88 dollars) for the research, development, testing and deployment of such theater defense systems

Brilliant Pebbles could have a role against missiles, so long as they go above about 60 miles altitude -- corresponding to a range greater than about 300 miles for a minimum energy trajectory. Brilliant Eyes also plays a role in enhancing the effectiveness of the theater architecture. The proposed budget for these systems is included under the "strategic" element of GPALS.



GPALS ELEMENTS - THEATER

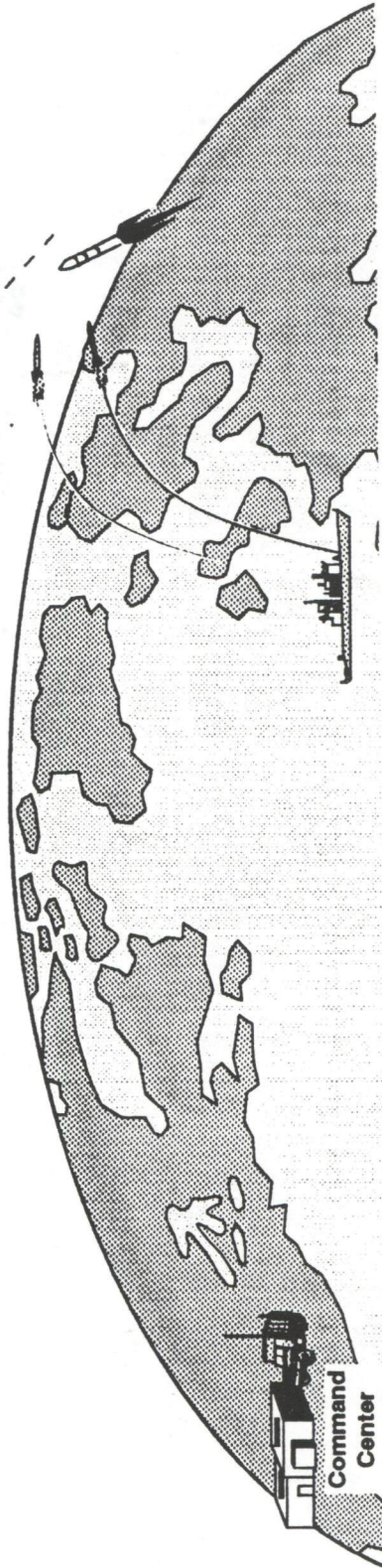
Defense Against Theater /
Tactical Ballistic Missiles

Brilliant Eyes



Brilliant
Pebbles

U.S. / Allied
Theater Defenses

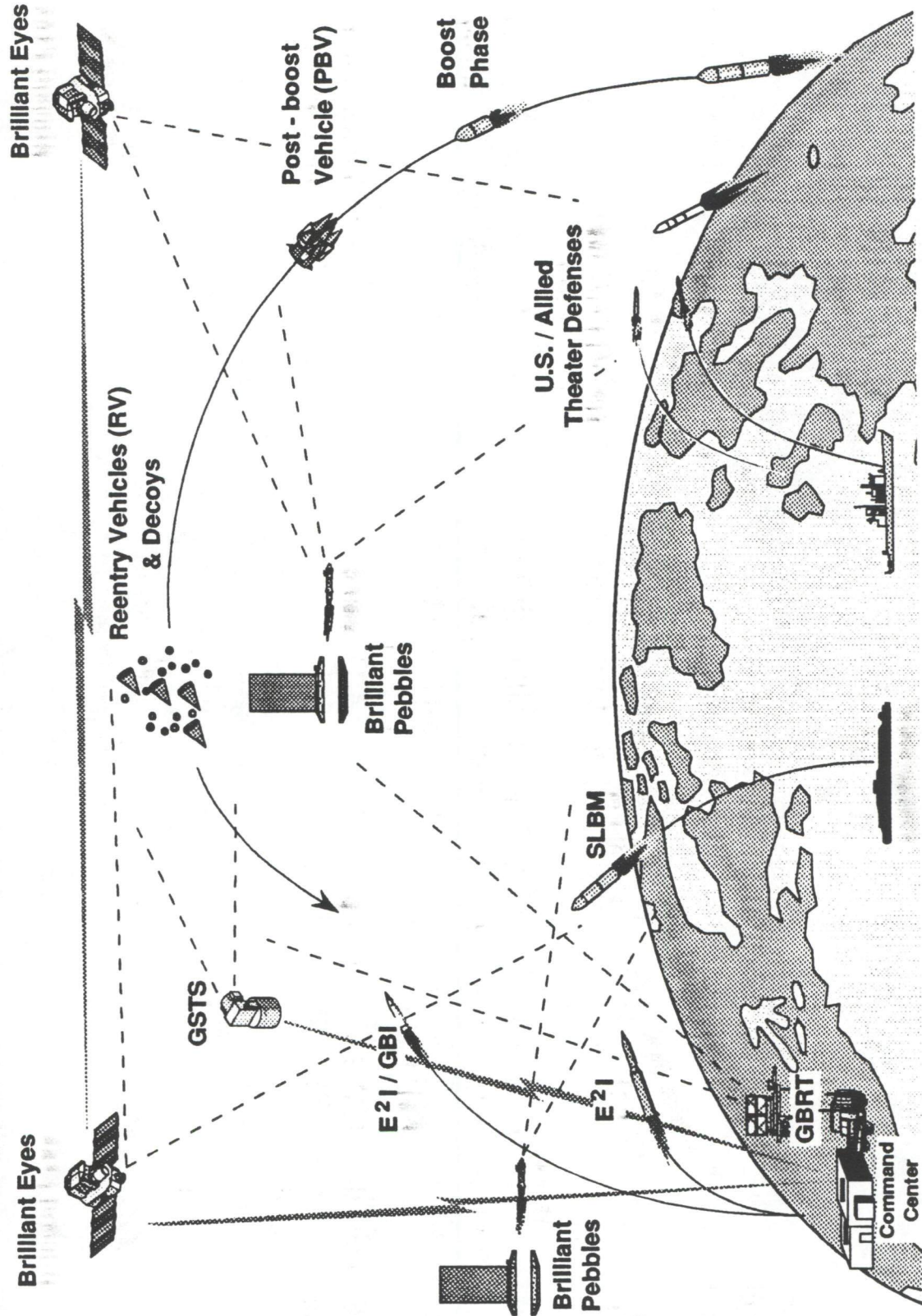


GPALS ELEMENTS - STRATEGIC AND THEATER

This chart fits all the pieces together -- strategic and theater -- for a complete perspective. Research, development, testing and deployment for all these elements is expected to cost about \$41 billion in FY 88 dollars.



GPALS ELEMENTS - STRATEGIC AND THEATER



SYSTEM ACQUISITION COST EVOLUTION

This chart addresses the cost of GPALS in the context of FY 88 dollars. FY 88 is the point of reference because that is the number normally used for comparisons of all architectural options since the Defense Acquisition Board meeting in 1987.

That board established an estimate for the initial Phase I architecture at about \$146 billion. By November of last year, innovations to the architecture for the old Phase I mission had reduced those estimates to around \$53 billion.

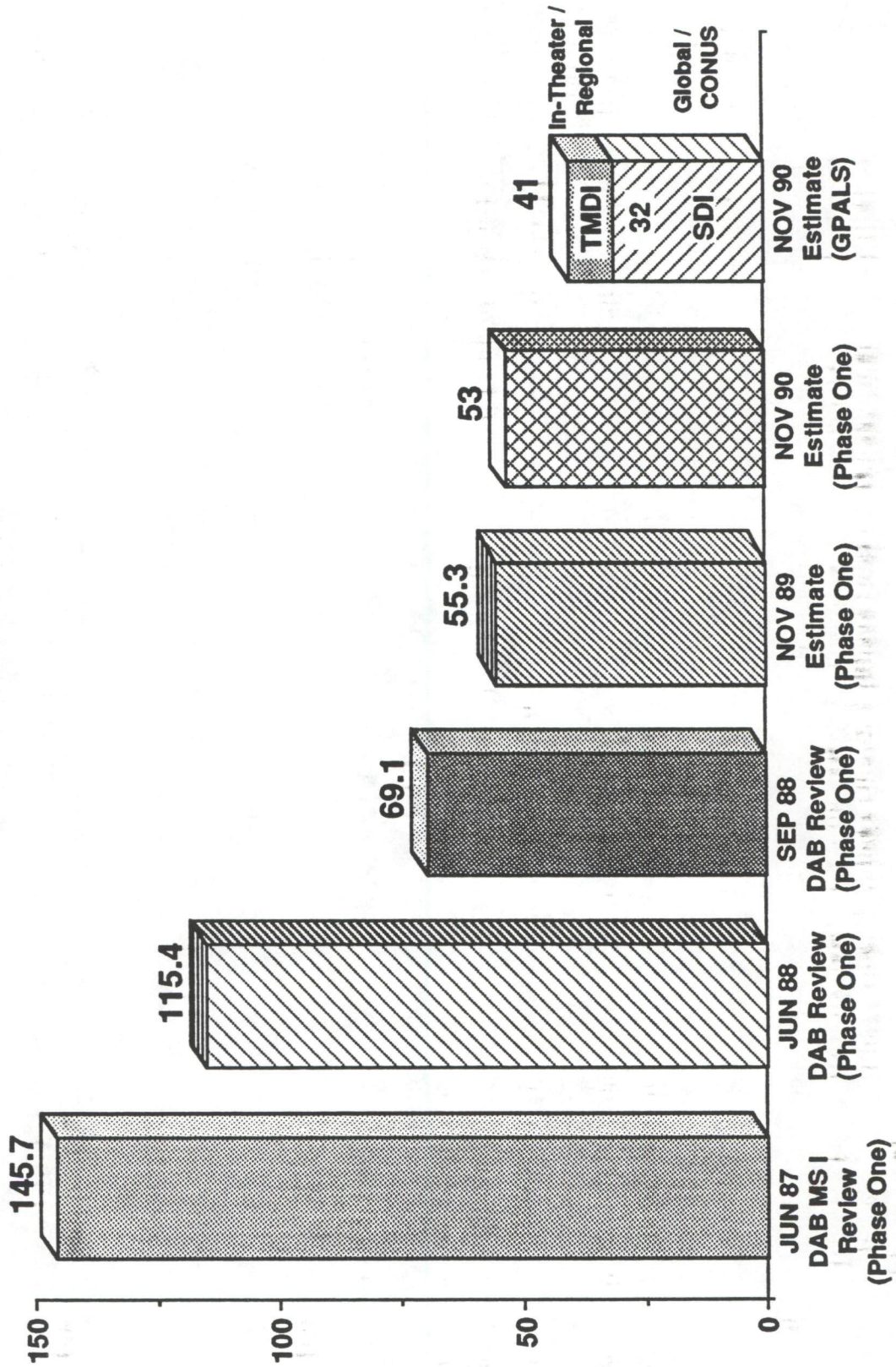
Looking at what is discussed for GPALS, the \$32 billion SDI block relates directly to the elements considered in the past as a part of Phase I -- i.e., Brilliant Pebbles and the ground-based defense against strategic ballistic missiles. It is some \$20 billion less than the complete Phase I architecture would have been.

To complete the GPALS system \$9 billion has been added to cover the investment costs for the defense against theater ballistic missiles. All together, we anticipate the research, development, testing and deployment of GPALS will cost \$41 billion in FY 88 dollars.



SYSTEM ACQUISITION COST EVOLUTION

FY 88 \$ In Billions



SDI BUDGET EVOLUTION

This chart illustrates, in FY 91 constant dollars, the overall investment strategy over a 20-year time-frame. It was constructed to address questions of affordability raised by Senator Nunn and others during last year's Congressional debate. Congressman Bennett referred to a \$12 billion request in the mid-1990s in an OpEd published by the Washington Post last week. If he had in mind last year's plan he was correct. However, the cost of our current plan has been greatly reduced.

We have arbitrarily established a limit at \$6 billion in the mid-1990s and the GPALS program has been paced accordingly. Proportionately, \$6 billion is about 20 percent of the amount spent on strategic programs today, and about two percent of today's overall defense budget.

The big cut in FY 91 is due to the Congressional cut to the President's budget last year. This was the third year in a row that our program was cut. We are seeking to restore the funding level that existed in the FY 88 period. Such a level is necessary to develop and deploy defenses for the American people by the end of this decade.

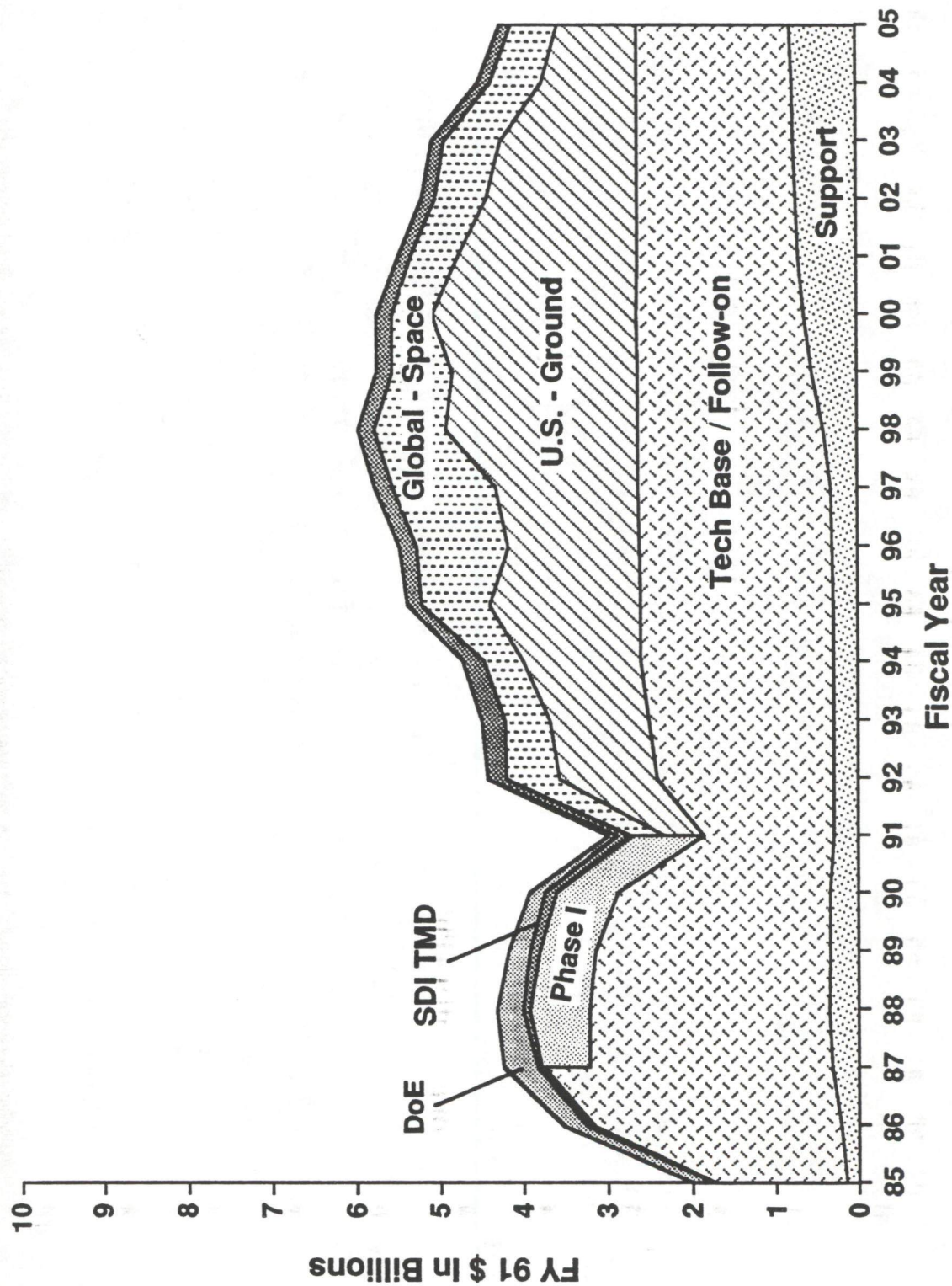
Last year's severe cut reduced the support for the technical base and the follow-on activities to a lower level than was appropriated in 1985, the first year SDI received appropriations.

The chart illustrates that we have been focusing our research, development and testing activities since 1987 on building a real capability and making that capability effective and efficient. SDI is no longer just a tech base or research program.

The ground-based/space-based ratio on the chart also indicates that considerably more -- by about a factor of three -- of the investment is in the ground-based part. Brilliant pebbles has helped to make the space-based element much less expensive than it was prior to last year. This clarification of our investment strategy refutes the all too frequent claims that the rest of the program is being indirectly taxed to support our space-based tier. Brilliant Pebbles.



SDI BUDGET EVOLUTION



BMD BUDGET EVOLUTION

This chart shows an overlay of the additional budget for the Theater Missile Defense Initiative (TMDI). Congress appropriated a new line item within the Department of Defense to focus on the early deployment of theater missile defenses, and the Secretary has assigned SDIO the responsibility for managing that program. The illustration reflects the dollars to support that particular line item. It is funded under the conventional programs, not under the strategic programs, budget line. The operational commanders establishing the requirements for TMDI are primarily conventional force commanders.

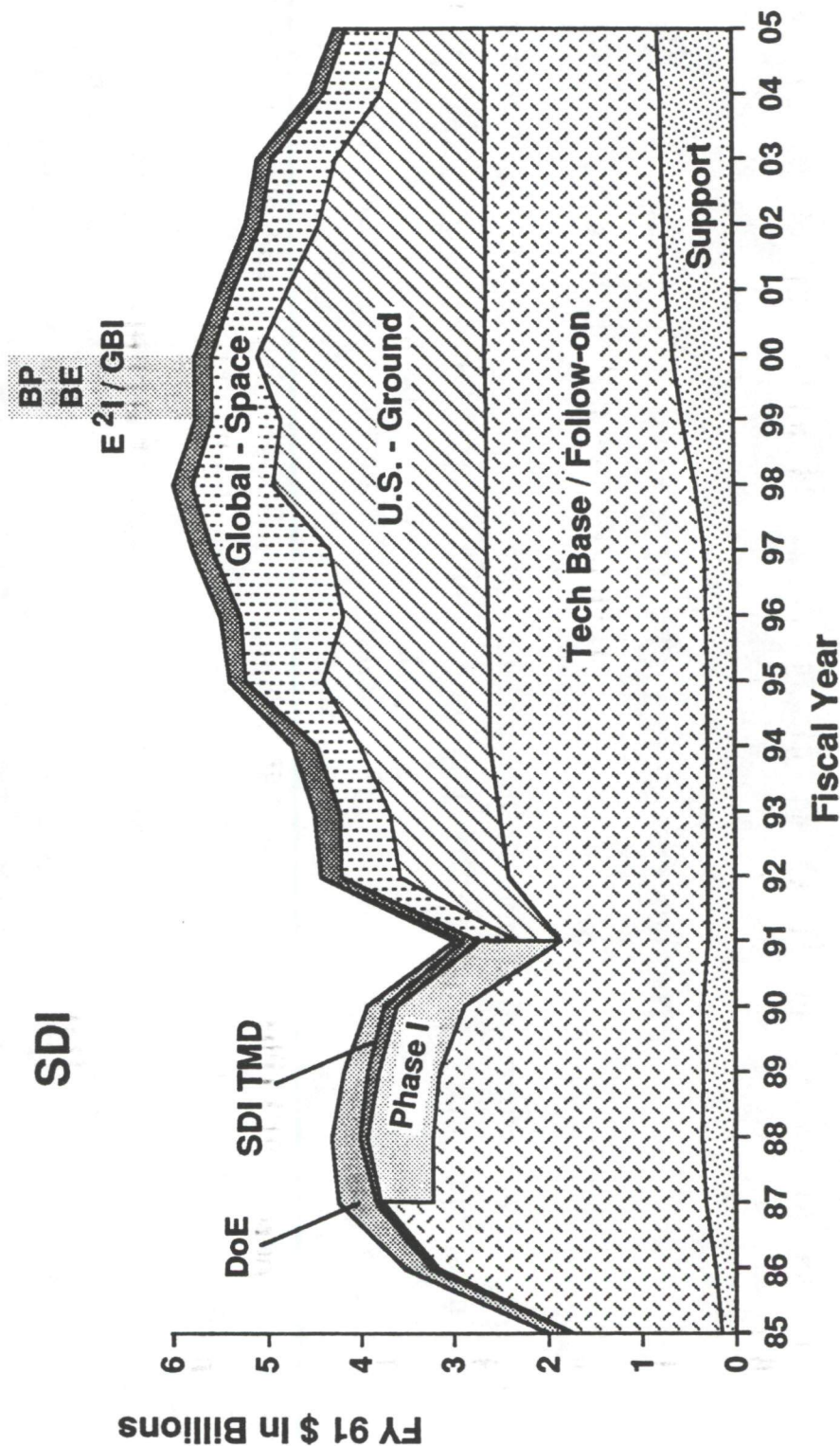
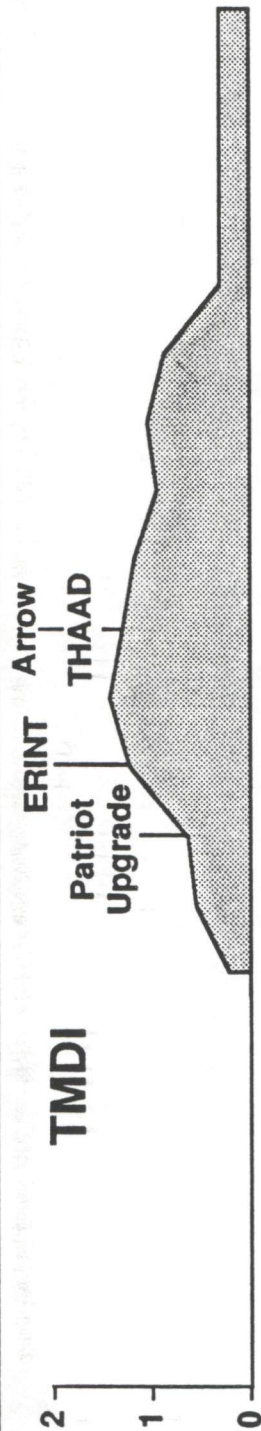
The vertical lines on the chart correspond to Initial Operating Capability dates for various theater defense elements during the first half of this decade, beginning with an upgrade to the current Patriot system. This will be followed by ERINT, which is a force enhancement, quadrupling the Patriot firepower with a hit-to-kill interceptor; and, as noted earlier, we are working with the Israelis to deploy Arrow by the mid-1990's. Arrow or THAAD, a wide area interceptor under development by the Army, will enable protection of 10 to 100 times the area of an existing Patriot battery.

The deployment dates for defenses for the American people against long range strategic ballistic missiles will come in the late 1990s, as illustrated by the vertical shaded region. To repeat, early deployments have to do with theater, not strategic, defense in the first half of the mid-1990s; the strategic defense deployment dates come late in the second half of the decade.

If we don't rectify the impact of last year's budget cuts by restoring our budget to FY 88 levels, deployment of a defense for the American people will likely slip into the next century.



BMD BUDGET EVOLUTION



GBI TECHNOLOGY HISTORY

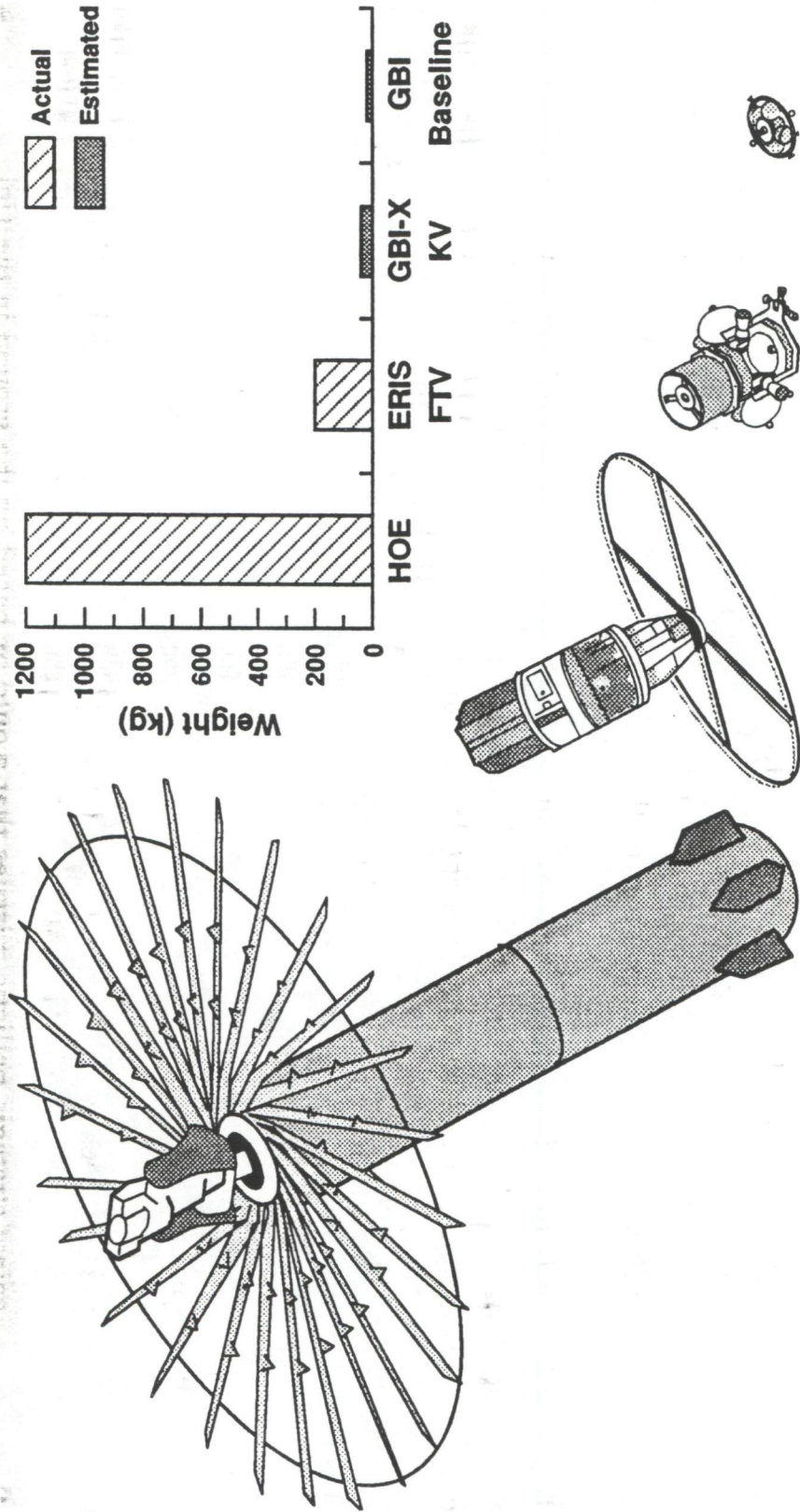
This chart illustrates our progress in demonstrating technical feasibility. The ground-based interceptor program is headed toward reducing size and weight to a deployable product weighing 10 to 20 pounds in the late 1990s.

In 1984, the Homing Overlay Experiment (HOE) exploited 1978 technologies to demonstrate with an interceptor weighing over a ton that we could, in principal, "hit a bullet with a bullet" -- with closing velocities approaching 7 km/sec. The ERIS test last week repeated this feat under more complex conditions with an interceptor based on 1986 technology weighing a few hundred pounds.

Where we are headed next in the ground-based interceptor program is toward reducing the size and weight as illustrated by the chart in the upper right hand corner, to a few tens of pounds and to something that might be deployable in the late 1990s that might weigh 10 to 20 pounds. Such an interceptor will have much more capable computers, sensors and propulsion units than we have today. And of course, if we move to deployment it will mean that along the way we will have worked to our critics' satisfaction the midcourse discrimination problem.



GBI TECHNOLOGY HISTORY



Technology	1978	1986	1990	1994
GBI Evolution	HOE Kill Vehicle	Eris FTV Kill Vehicle	GBI-X Kill Vehicle	GBI Baseline Kill Vehicle
Proven / Tested	1984	1991	1995	1998

SPACE - GROUND R&D INVESTMENTS

This chart illustrates the relative investment strategy between space- and ground-based elements and is intended to correct the misperception that the program is unbalanced and that we are spending too much on the space element, Brilliant Pebbles, as compared to other system elements. Historically, the investment strategy called for about the same level of investment in both the ground-based and the space-based tiers. In 1991, there was a substantial drop in our investment in the space-based portion. The innovation provided by Brilliant Pebbles meant that we no longer required the BSTS -- Boost Surveillance and Tracking System -- as an integral part of the architecture.

The future objective is to return to the earlier investment level for the space-based tier -- to roughly the same level as in the three years preceding 1991. At the same time, we intend to move out more rapidly with the ground-based elements so as to have concurrent space-and ground-base deployment dates in the late 1990s.

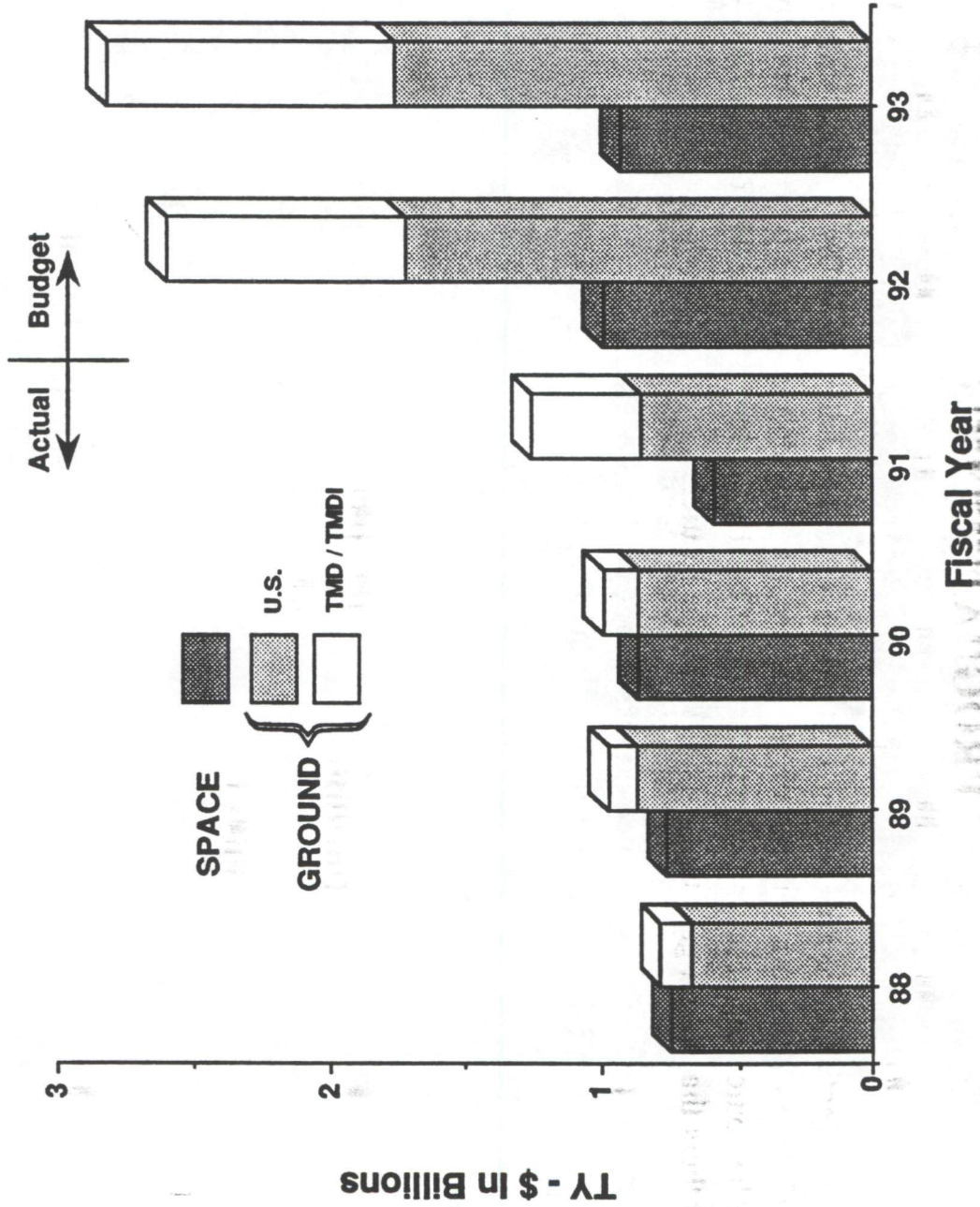
The investments in theater defenses are for primarily ground-based systems, although they might be sea-based, and we're even looking at the possibility of air-based interceptors in one architectural study.

This year, we are spending approximately \$2 on the ground-based elements for every \$1 on the space-based element. By 1993, we anticipate spending \$3 on ground-based for every \$1 on space.

That sense of proportion goes with the size of the puzzle pieces shown earlier, which reflected basically the relative total investment costs -- about \$10 billion for Brilliant Pebbles, \$9 billion for the theater missile defense portion, and \$22 billion for the defense against strategic ballistic missiles that would be based on the ground in the United States -- for a total of some \$41 billion in 1988 dollars.



SPACE - GROUND R&D INVESTMENTS



PROGRAM FOCUS

To reiterate our objectives, we are seeking protection; we are considering ballistic missile attacks involving a limited number of reentry vehicles -- tens to a hundred or so; and we are considering attacks on U.S. forces overseas as well as U.S. friends and allies. The source of these limited attacks might be the Soviet Union or Third countries -- some we know about today, but possibly others that might gain that capability in the future.

March 1991



1991
JOINT MILITARY
NET ASSESSMENT

Foreword by the Secretary of Defense

This Joint Military Net Assessment was prepared in a period of great change in the strategic environment. Begun on the heels of the "Revolution of '89," the 1991 Joint Military Net Assessment was completed on the eve of military action to implement the UN mandate to force Iraq to withdraw its troops from Kuwait. One of the major reasons for our great success in this campaign and confidence in the ultimate outcome is the excellence of our military men and women. We also are certain there will be much to learn from this experience for future military assessments.

But, even as this document is signed and conveyed to the US Congress, the struggle in the Gulf is only one change in the strategic environment. A second, crucial change is unfolding in the Soviet Union. The revolutionary change in the nations of Eastern Europe in the past 2 years has been more wide-ranging and sweeping than anything we have seen in the previous 40 years. Noncommunists now lead in most of the former non-Soviet Warsaw Pact states. Germany has been unified in NATO. The Soviet Union has agreed to withdraw its troops from Czechoslovakia, Hungary, and Germany and is unilaterally reducing its general purpose forces at home. The Warsaw Pact is set to be dissolved on April 1st.

But the moves towards democracy and demilitarization of the Soviet Union that we all welcomed now appear to be in doubt. Recent, worrisome events raise questions about the prospects for needed economic and political reform and the Soviet Union's future course at home.

The economic situation in the Soviet Union today is as bleak as it has been since the end of World War II. Given these poor economic prospects, we have to anticipate that there will continue to be economic decline in the Soviet Union and increased prospects for significant unrest. It is hard to discern, at this point, a strategy at the center for dealing with these problems or regenerating a process of reform.

Political reform in the Soviet Union is also under attack. Rather than moving toward greater openness to resolve the underlying problems, President Gorbachev appears ready to rely on the security services and the military and their use of force to maintain order inside the Soviet Union. There is now a widespread consensus among Soviet observers that the central government is increasingly influenced by the military and the security services, as well as the Communist party bureaucracy.

Foreword

In the absence of ongoing reform, there is little prospect for a permanent transformation in East-West relations. Experience shows that ultimately US-Soviet relations are driven by how the Soviet Union governs itself. Except at the margins, long-term improvement depends on the democratization and demilitarization of Soviet society. The failure of reform would not necessarily mean a return to the worst days of the Cold War, but it would prevent movement to a thoroughgoing, across-the-board state of cooperation with the Soviet Union.

Five implications of these conflicting trends must be weighed. First, the Warsaw Pact is dead as a military organization and the threat of a short-warning, global war starting in Europe is now less likely than at any time in the last 45 years. Nonetheless, the Soviet military will remain, by a wide margin, the largest armed force on the continent. Second, the Soviet ability to project conventional power beyond its borders will continue to decline, whether that decline is part of a broad strategy of improving relations with the West or whether it is simply an unintended effect of the continued economic collapse of the Soviet Union. Third, there is enormous uncertainty about developments inside the Soviet Union and adjacent areas, and this should be reflected in our planning. Fourth, and a key point, the Soviets not only retain significant strategic nuclear capability but they are modernizing it virtually across the board. Fifth, while we are hopeful of eventual success, the prospects for arms control — both conventional and strategic — are now in doubt.

Reform in the Soviet Union need not fail. Our President has said many times that we want the process of reform in the Soviet Union to succeed. We still hope that it will be successful, and the central government, we believe, may still be able to take steps to return to the path of reform.

But uncertainty about change in the Soviet Union is not our only concern in the emerging security environment. We face the sobering truth that local sources of instability and oppression will continue to foster conflicts small and large in areas of interest to the United States. The Gulf conflict has illustrated once again that these regional crises and conflicts are likely to arise or to escalate unpredictably, on very short notice, and often far from home. The war against Iraq presages a type of conflict we are likely to confront again in this new era — major regional conflicts against foes well-armed with elements of advanced conventional and unconventional weaponry. We must configure our policies and our forces to effectively deter, or quickly defeat, such future regional threats.

This Joint Military Net Assessment will aid our analytical efforts to provide for America's defense in the face of these and other changes in the strategic environment.

A handwritten signature in dark ink, reading "Dick Cheney". The signature is fluid and cursive, with a large initial "D" and a long, sweeping underline.

Dick Cheney
Secretary of Defense
March 1991

Preface

BACKGROUND

The 1991 JMNA is a comprehensive military assessment prepared in accordance with the National Defense Authorization Act for FY 1989. It is published in classified and unclassified versions and provided to Congress by the Secretary of Defense. The JMNA was prepared by the Chairman, Joint Chiefs of Staff, in coordination and consultation with the Military Service Chiefs of Staff, the commanders of the unified and specified commands, the US Coast Guard, the Intelligence Community, and the Joint Staff.

PURPOSE AND SCOPE

The purpose of the JMNA is to assess the forces and capabilities of US Armed Forces and allies against those of potential adversaries. Accordingly, the JMNA reviews the current strategic environment, threats to US interests, and national security objectives; it assesses the capability of the forces and programs in the FY 92-93 PB and the FY 92-97 FYDP to accomplish national security objectives. It qualitatively and quantitatively assesses strategic forces, nonstrategic nuclear forces, space forces, and general purpose conventional forces in several scenarios against regional and global concerns. It also examines a number of special interest areas. The report concludes with a trend analysis and risk assessment. Special access programs are not included in this assessment.

The current balance and trends for the periods immediately preceding and following the report date are analyzed in the context of the following force structure constructs:

- ❑ FY 1986 fielded force — for historical comparison and trend analysis.
- ❑ FY 1991 fielded force — consisting of those items of equipment expected to be delivered through the end of FY 1991, and the personnel end strength expected to exist based on the President's FY 1991 Amended Budget Submission.
- ❑ FY 1995 fielded force — consisting of those items of equipment expected to be procured by the FY92-93 PB through the end of FY 1993 and delivered through the end of FY 1995, as well as the personnel end strength expected to exist based on the FY 1995 Defense Program.

Preface

- ❑ FY 1999 fielded force — consisting of those items of equipment expected to be procured by the FY 92-97 FYDP through the end of FY 1997 and delivered through the end of FY 1999, as well as the personnel end strength expected to exist through the end of FY 1999.

Where appropriate for direct comparisons, the forces of potential adversaries shown are fielded forces for the end of the FY indicated, based on coordinated estimates of the Intelligence Community.

The effective date for most data is 15 January 1991. The effective date for equipment and force structure projections, based on the FY 92-93 PB and the FY 92-97 FYDP, is 20 February 1991.

METHODOLOGY

The JMNA was developed using previous analyses, estimates, expert advice, models, politico-military gaming and seminars, static comparisons, and the military judgment of senior leaders. With the strategic environment as a backdrop, force capabilities are assessed in multiple scenarios against the capabilities and perceived intentions of potential US adversaries.

This unclassified version of the 1991 JMNA is based solely on the document forwarded to Congress by the Secretary of Defense on 2 March 1991. No attempt has been made to update the contents or conclusions based on changes in the international or domestic environments since that date.

DOCUMENT OVERVIEW

This document is organized into three main parts. Part I addresses the international and domestic environments in light of their impacts on the US Armed Forces and their capabilities. Part II describes the analyses conducted to determine the capabilities of US forces. A number of separate and discrete areas are examined. Part III is the synthesis of Parts I and II, reporting the results of our studies and drawing conclusions concerning overall capabilities and risk.

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PART III — Assessment

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Part I.
The International
and Domestic Environments

Chapter 1.

The Emerging World Order

THE STRATEGIC CONTEXT

A Period of Upheaval

The international security setting is undergoing sweeping change — the most consequential since the close of World War II. Forty years of Cold War confrontation have given way to a new world order. Characterized first and foremost by a fundamental shift in relations between the United States and the Soviet Union, this new order has permitted the increased democratization of Eastern Europe and has resulted in turmoil of uncertain outcome within the Soviet republics. In the wake of this remarkable reality, a host of other security concerns have followed or intensified: regional disputes across a wide spectrum of conflict; drug trafficking; terrorism; and the proliferation of weapons of great destructiveness. Taken as a whole, this extraordinary period of transition in international affairs is of such a magnitude it requires a reassessment and a fundamental review of the parameters that have shaped US national military strategy.

Forces Shaping the Strategic Landscape

The demise of the Cold War can be likened to a monumental shift in the tectonic plates, unleashing a host of forces that are irrevocably reshaping the strategic landscape. Each of these forces has enormous implications for US national security policy and military strategy. First is the astounding advent of a second “Russian Revolution” in this century — one that is redefining and redirecting the security objectives of the Soviet Union, a process that continues along an uncertain course toward a hoped for peaceful

The international security environment is undergoing a profound transformation that is due in no small measure to steadfast US and allied strategies. The implications of this historic and welcome upheaval in the strategic landscape cut across the entire fabric of the US Armed Forces. Thus, the opening pages of this document are devoted to an assessment of: (1) the dramatically changing strategic context in which US national security strategy is executed; (2) the enduring security objectives the national military strategy must support; (3) the threats, actual and potential, to which US Armed Forces must respond; (4) the unrelenting demands imposed on the United States as the leading Free World power; and (5) the potential for conflict that might require the introduction of our military strength.

The Emerging World Order

future. A second and related force is the rapid achievement of German unification and the accelerating demise of the Warsaw Pact, forcing a reexamination of the role of the Atlantic Alliance. Third is the prospect for a markedly increased political and economic unification in Europe, creating a new, powerful force on the world scene. Next is the intensification of intractable conflicts between historical enemies, now fueled by weapons of enormous destructiveness and less constrained by the bipolar Superpower alignments. Fifth, we herald the unprecedented march to democracy in many parts of the Third World. However, major portions of the world lag in the continuing struggle to improve the human condition. This lag, coupled with heightened expectations born of the ever-widening span of knowledge of progress in other areas of the world, are giving rise to insurgencies, terrorism, drug-trafficking, and nationalist fervor. Sixth, we may have to confront the rise of new agendas that may abort the long-sought era of peaceful international cooperation. The Iraqi brutalization of Kuwait is just such an aggression, and Operations DESERT SHIELD and DESERT STORM demonstrate international intolerance for such behavior. Finally, the explosion of information and technology is irrevocably changing the tools of national influence. From this vast array of forces shaping the strategic landscape, we see a shift in the focus of military planning and an emergence of an entirely new international context for US military strategy, more focused on multinational cooperation sanctioned by international bodies such as the United Nations, and different and in many ways more complex than the Cold War era it replaces.

The Emerging Realities

The long-sought receding Soviet threat, coupled with US budget and trade deficits, has brought to bear a domestic force every bit as consequential as the external forces to reassessing our strategies. The new global realities and the compelling requirement to bring government spending and revenues into balance will produce pressures to reduce the level of spending on the nation's defense. It is truly a hopeful era, one of a shift toward a more peaceful world, one we helped bring about. We applaud the Soviet contribution to a more cooperative world. We cannot, however, forecast the Soviets' speed or success in their trend toward democracy and becoming a responsible member of the international community. Further, Soviet military power is hardly becoming irrelevant; we must continue to counterbalance their capabilities.

NATIONAL SECURITY INTERESTS AND OBJECTIVES

Notwithstanding the twin forces of international change and domestic budget deficits, the broad national security interests that give focus to military objectives, strategy, and forces remain largely constant. As described in the President's National Security Strategy Report of March 1990, these interests and objectives encompass:

- ❑ The survival of the United States as a free and independent nation, with its fundamental values intact and its institutions and people secure.

- ❑ A healthy and growing US economy to ensure opportunity for individual prosperity and a resource base for national endeavors at home and abroad.
- ❑ A stable and secure world, fostering political freedom, human rights, and democratic institutions.
- ❑ Healthy, cooperative, and politically vigorous relations with allies and friendly nations.

THREATS TO US INTERESTS

For 40 years, the Soviet Union and its surrogates posed the principal threat to the foregoing interests and objectives. However, with the collapse of East European communism, the demise of the Warsaw Pact, ongoing changes within the Soviet Union, the reshaping of US-Soviet relationships, and a reduction in Soviet conventional military power, our security agenda is being rewritten. This redefinition of our threat perception has been accelerated by the emergence and intensification of both new and historical regional quarrels; one has already brought the United States into armed conflict in the Persian Gulf. Our efforts to promote regional stability and to enhance the spread of democracy will continue to be challenged by insurgencies and terrorism. Economically and technologically, the United States is facing stiff competition from Japan and Germany. Elsewhere, threats to US interests range from the enmity of nations like North Korea and Cuba to pressures from friend and foe alike to reduce US presence around the world.

ENDURING DEFENSE REALITIES

There is much to hope for in the new US-Soviet relationship; there is also much to be seen. Even with the promise of a greatly reduced Soviet force posture in Eastern Europe, certain crucial constants endure in our long-term assessment of Soviet military capability and global threats.

The Soviet Union

The Nuclear Threat. The most enduring concern for US defense planners is that, notwithstanding its evolving ideology and the intentions of its current leadership, the Soviet Union remains the one country in the world capable of destroying the United States with a single devastating attack. However, the rationale for such an attack is difficult to construe. Nevertheless, until and unless the Soviet strategic nuclear arsenal is vastly modified, the cornerstone of US military strategy must continue to be a modern, credible, flexible, and survivable nuclear deterrent force.

The Conventional Threat. Soviet military power, though at long last being reduced and changed in form and purpose, is hardly becoming irrelevant. Whatever the future Soviet state may look like, it still will have millions of well-armed men in uniform and will remain, by far, the strongest military force on the Eurasian landmass. The United

The Emerging World Order

States, as the leader of the Free World, must maintain the conventional capability to globally counterbalance the might of the Soviet Union's huge conventional forces, in conjunction with our allies.

Across the Atlantic

Looking eastward from our Atlantic shore, the focus of US security concern has shifted in a remarkably short period from Western Europe to both the defense of Europe and the Persian Gulf. With respect to Europe, the demise of the Warsaw Pact, Soviet retrenchment, German unification, and the prospect of economic integration embody the success of collective defense, as well as the imperatives for new approaches to collective security. Although the prospect of a concerted military threat to Western Europe from the east has faded dramatically, continuing political and economic instability in Eastern Europe and the Soviet Union presents new concerns. Consequently, we and our NATO partners are conducting a thorough review of Alliance strategy. The broad outlines of a new force posture are already emerging and include highly mobile units, some of which will be restructured into multinational formations. The number of active units will be scaled back, and increasing reliance will be placed on mobilization and reconstitution.

Looking through the Mediterranean to the Middle East and Persian Gulf, regional threats to US vital interests and enduring obligations will place continuing demands on our Armed Forces. Escort operations in the Persian Gulf, conducted for over 2 years, established the precedent of US military intervention to protect the free flow of oil. Then, just as the Soviet Union and the Iran-Iraq war receded as threats to regional stability, Iraq emerged from 8 years of war with a fanatic zeal, a large arsenal, a shattered economy, overwhelming foreign debts, and a trumped-up quarrel with Kuwait. Now that Iraq has been ejected from Kuwait by the US-led international coalition, we still face an uncertain future; we will maintain our commitment, and we expect to reduce, but not eliminate, our forces in this region.

Across the Pacific

The divided Korean peninsula stands in stark contrast to the dissipating Cold War in Europe. However, the US security burden is being eased by the continuing surge of democracy, economic growth, and military capability in South Korea. Our reassessment of the US-ROK security relationship concluded that the United States could undertake a prudent, phased series of steps to reduce its force presence in Korea modestly — as well as in Japan and elsewhere in the Pacific — and could initiate a gradual transition toward a partnership in which ROK armed forces assume the leading role. Should deterrence fail, however, in-place and reinforcing US forces would still be required. For the region as a whole, a modest level of US military presence — principally maritime — will be essential to preserve stability, encourage democracy, and deter aggression.

The Rest of the World

This broad characterization is not intended to either diminish or denigrate the importance of US interests, friends, and allies in regions beyond Europe, the Middle East, and the Pacific. Rather, from a planner's perspective, the nature and urgency of threats beyond those especially compelling locales are such that the threats can be dealt with by a judicious mix of active forces adequate to protect the most vital US interests and by units with specialized capabilities and mobility for crises at the lower end of the spectrum of conflict. The more important point is that many regional disputes are becoming increasingly more lethal with the proliferation of advanced technology weapons. As a consequence, the introduction of US military power into such disputes must always be prefaced by serious-minded planning and preparation for combat.

IMPLICATIONS FOR FORCES

Scenarios for Force and Capability Assessment

The growing complexity of the international security environment makes it increasingly difficult to predict and estimate the circumstances under which US military power might be employed. While we retain our plans to deter the Soviet threat globally, new planning will be focused primarily on regional contingencies, describing the conditions under which crises might arise and constructing response plans, as well as programming strategies, for dealing with them.

To analyze force size, mobility, and support requirements, we have developed a set of conventional conflict scenarios. These scenarios, described in greater detail in Chapter 9, Table 9-1, define plausible circumstances that might call for the application of US military power. The scenarios include critical assumptions about threats, warning time, and concepts of operation of friendly forces. The scenarios also provide explicit criteria for the assessment of forces, readiness, mobilization, mobility, and sustainment. Although these scenarios represent the types of situations we believe we must be prepared to face in the future, they were not the basis for the programs that produced our current capabilities; their details remain under study, and their implications are only now being incorporated into the FYDP. Thus, this assessment represents a first report of the transition from planning and programming principally for global war

SCENARIOS

- ❑ Peacetime Engagement
Counterinsurgency
Counternarcotics
- ❑ Lesser Regional Contingencies
2,000 nm and 6,000 nm from
the United States
- ❑ Major Regional Contingency —
West
- ❑ Major Regional Contingency —
East
Middle East and Persian Gulf
- ❑ War escalating from a European
crisis
Potential for global conflict

The Emerging World Order

with the Soviet Union to planning and programming for the regional situations we expect to face in the 1990s.

As the threats to US interests have changed, the scenarios selected for conventional force structure and capability assessment have changed. The preponderance of emphasis now rests with potential conflicts lower on the spectrum of conflict scale where the probability of occurrence is greater. This contrasts with earlier assessments, whose scenario stressed a global conflict between NATO and the Warsaw Pact. It must be stressed, however, that these scenarios are not predictive. They are intended specifically to evaluate forces and programs and should not be construed as strategy.

Probability of Occurrence

Although military force structure and capabilities are determined in large part by the nature of the threats they might confront, critical judgments are also required as to the likelihood that prospective conflict might arise. Figure 1-1 arrays the scenarios on the spectrum of conflict and graphically depicts that the probability of occurrence decreases as the level of intensity increases. The implication for policymakers and force planners is that we are more likely to be involved in conflicts at the mid- to low-level end of the spectrum of conflict.

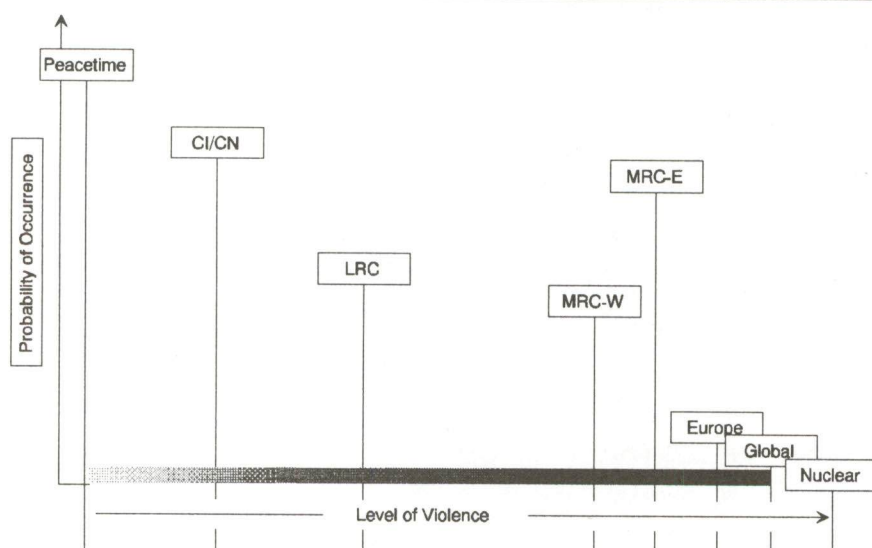


Figure 1-1. Probability of Occurrence

Consequences of Failure

Although the probability of occurrence is important, of greater concern are the consequences of failing to attain national objectives in a postulated conflict. Thus, judgments about future force needs must be tempered by considered determinations involving the

probability of the crisis and the consequences of failure. Figure 1-2 arrays the same scenarios along the spectrum of conflict and graphically depicts where the consequences of failure are highest. The implication for policymakers and force planners is that we need to pay serious attention to both ends of the spectrum of conflict.

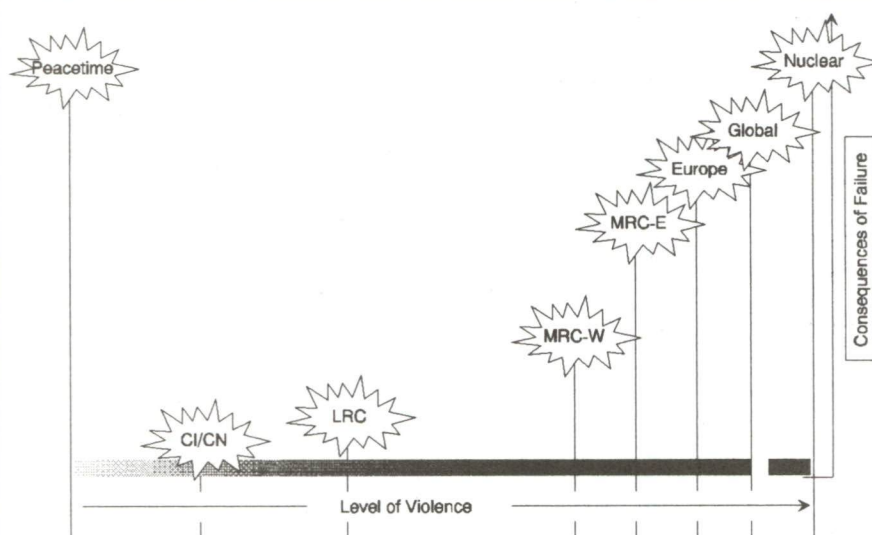


Figure 1-2. Consequences of Failure

Force Implications

Figure 1-3 on page 1-8 combines the previous points on one set of axes and provides a useful tool to visualize some basic implications for force structure.

The spectrum of conflict, peace through nuclear war, has not changed; it continues to provide a method to overlay various scenarios. However, the focus of our attention has shifted as we view the changing international situation and threat. Previously, conventional force requirements were generated by focusing attention toward the right end of the spectrum, where the threat was large and the consequence of failure was great (depicted by the lightly shaded area on the graph). Consequently, our conventional force structure was large, heavy, and robust. However, more recently our focus has shifted to the left (depicted by the darker shaded area) for many of the reasons cited earlier. Today, the probability of occurrence for conventional conflicts at the right end of the spectrum is low, and warning time has so greatly increased, that these conflicts are no longer the central point of focus or the principal driver of requirements for forces. We find now, however, that the focus of attention and risk is the range of conflict scenarios where the probability of occurrence is greater and the consequences of failure are still high. Conflicts arising in this range require a highly responsive force capability that can react rapidly from anywhere in the world with an appropriate mixture of maritime, air, and ground forces.

The Emerging World Order

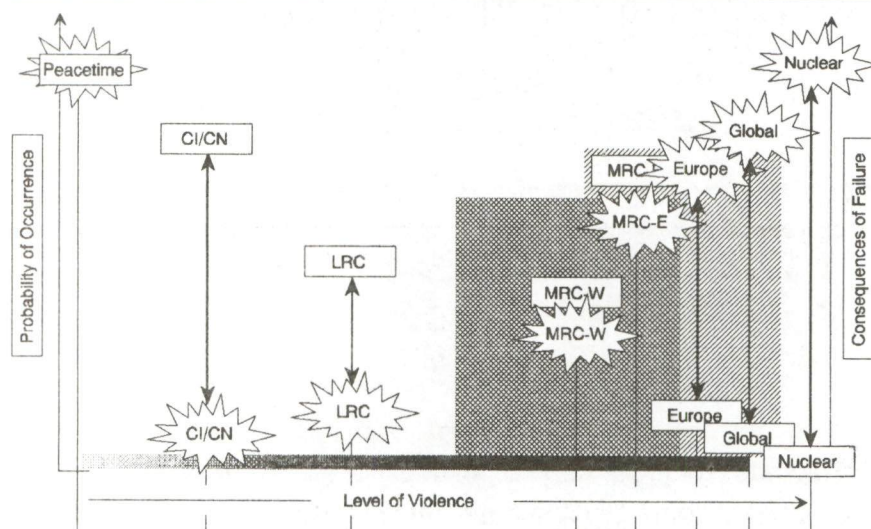


Figure 1-3. Probability of Occurrence and Consequences of Failure

The extreme right end of the spectrum of conflict in Figure 1-3 also illustrates implications for force capability. The compelling need for capable and modernized nuclear and conventional forces is shown on the right side of the graph, where the probability of occurrence is low against a real and capable threat but where the consequences of failure are so grave they cannot be ignored. On the extreme left of the figure, our global interests are being assaulted daily by a diverse range of threats where the consequences of failure could significantly impede our peacetime objectives. Consequently, our force structure must constitute a credible deterrent, have a forward presence component, and be mobile and capable of responding to a diverse set of contingencies across the spectrum of conflict.

Many significant challenges to US interests endure. However, the combination of the demise of the Cold War and our domestic budget realities reduced defense spending and began our efforts to reshape the military forces to meet the challenges of the future. These efforts must preserve our strength, effectiveness, technological superiority, and capabilities. It is clear that the military force this nation has built to counter the global threat has provided us with the means to successfully meet the many challenges of the future, as we are learning from Operations DESERT SHIELD and DESERT STORM. In responding to this regional contingency, we are depending on the full spectrum of our well-trained, technologically superior forces. The potential threats of an uncertain future dictate that the United States must continue to maintain highly trained, well-equipped, capable, technologically advanced, deployable, robust forces, as well as the ability to reconstitute larger forces, should global threats arise that make such action necessary.

CONCLUSIONS

The emerging world order provides a rationale for US force structure from the perspective of threats to US interests, enduring defense realities, the probability of conflict, and the consequences of failure.

Chapter 2.

The Role of US Armed Forces

OBJECTIVES

National Military Objectives

The explicit purposes of US Armed Forces are spelled out in Table 2-1 on the following page. These enduring tasks are in accord with the constancy of "providing for the common defense" and deterring aggression through overwhelming strength. However, the primary threats, and hence the focus of military planning, are shifting rapidly in the post-Cold War era. Although Soviet strategic nuclear forces will continue to represent the most compelling potential threat to our national survival and Soviet conventional capabilities remain an important force to reckon with, the improving atmosphere of East-West relations dictates a shift in focus to emphasize regional threats of equally serious consequence to US vital interests.

Within this turbulent environment of transformed adversaries and newly emergent threats, the fundamental role of the US Armed Forces remains constant: to prevent war and to defend the nation's vital interests through a manifest capability to inflict overwhelming destruction on any potential foe. The importance of deterrence implicit in this statement of basic purpose is directed by the President. It has served the nation well for 40 years. A great democratic power with global interests and commitments is morally bound to an inherently defensive posture and a military force of wide-ranging capabilities.

Regional Objectives

Europe. As the European continent emerges from the shadow of the Cold War, the United States will continue to encourage and participate in a steady and peaceful transition from an era of continental demarcation into one of economic and political integration. Already, long-dormant fears and competing claims have emerged, rekindling historical antagonisms that threaten anew the long-sought promise of European stability and integration. Further, despite the strong prospects for a whole, free Europe, the specter of the Soviets' residual military power will continue to loom over their western neighbors. Thus, given our strong cultural links and enormous economic investments, we have an enduring stake in European security. For the foreseeable future, that vital interest is best served by a military presence embodied within a dynamic NATO.

The Role of US Armed Forces

Table 2-1. National Military Objectives

❑ **Deter or Defeat Aggression, in Concert with Allies**

Deter military attack by any nation against the United States, its allies, and other countries whose sovereignty is vital to our own; and defeat such attack, singly or in concert with others, should deterrence fail.

❑ **Ensure Global Access and Influence**

Protect free commerce; enhance the spread of democracy; guarantee US access to world markets, associated critical resources, air and sea LOCs, and space; and contribute to US influence around the world.

❑ **Promote Regional Stability and Cooperation**

Contribute to regional stability through military presence, mutual security arrangements, and security assistance; and, to discourage thereby, in concert with other instruments of national power, policies and objectives inimical to US security interests.

❑ **Staunch the Flow of Illegal Drugs**

Stem the production and transit of illegal drugs and their entry into the United States.

❑ **Combat Terrorism**

Participate in the national program to thwart and respond to the actions of state-sponsored terrorist organizations.

The Middle East and Persian Gulf. Recent events have thrust this volatile region to the forefront of our security agenda. The President has committed the full force of America's prestige, influence, and military power to upholding the principles of civilized behavior and ensuring the free trade of a critical resource. He has declared that domination of the Arabian peninsula by a hostile power cannot be tolerated. Thus, the traditional terms of American presence in the Gulf region have been forever transformed. It is becoming increasingly evident that the vital interests of the United States and its allies will be best served by a continued, modest military presence within the region. When the current crisis is resolved, the long-range character of our military posture must be established. However, given our enduring commitment to this region and the increasingly important link of global economic health to Gulf oil resources, it is clear that restoring and preserving regional stability will have a major influence on US military planning and programming for years to come.

The Far East. Throughout the Far East and into South Asia, the presence of US ground, maritime, and air forces is a visible, irreplaceable symbol of American interest, friendship, and concern for regional peace and stability. In North Korea, the winds of *glasnost* and *perestroika* have yet to penetrate the barriers of unrelenting antagonism and militarization imposed by Kim Il Sung. Consequently, despite the near-miraculous economic growth in South Korea and the steady advance of its defense capabilities, the continuing presence of US combat forces is essential to bolster deterrence, as well as to promote the long-term prospects for a peaceful North-South dialogue. Should deterrence fail, in-place and reinforcing US combat power is absolutely necessary to blunt, reverse, and

defeat the type of short-warning attack that North Korea clearly is capable of mounting. Elsewhere in the region, our commitment to the security of Japan and our availability to assist other friends and allies defuse the potential for an excessive buildup of national armed forces.

Elsewhere in the World. In the less-predictable yet increasingly important other regions of the globe, the United States seeks to preserve its access to foreign markets and resources, mediate the traumas of economic and social strife, deter regional aggressors, and promote the regional stability necessary for progress and prosperity. From Latin America to sub-Saharan Africa to the far-flung islands of the world's oceans, American military men and women contribute daily to the unsung tasks of nation-building, security assistance, and quiet diplomacy that protect and extend our political good will and access to foreign markets. Such access becomes increasingly critical in an era of reduced forward presence, when forces deploying from the United States are more dependent than ever upon en route and host-nation support to ensure timely response to distant crises. In the future, maintaining forward presence through combined planning and exercises, pre-positioning and servicing agreements, and combined warfighting doctrine and interoperability — all within a global network of mutual security arrangements — could spell the difference between success or failure in defending vital regional interests.

CENTRAL MILITARY STRATEGY CONCEPTS

US military strategy is founded on the premise that America will continue to serve a unique leadership responsibility for preserving global peace and stability. It is derived from US defense strategy, which formerly focused primarily on containing Soviet aggression on a global scale. This defense strategy is now shifting to added focus on forward presence, crisis response, and reconstitution as its major themes, while maintaining our long-term reliance on nuclear deterrence. Because of changes in defense strategy, priorities and emphasis among the various principles that describe the national military strategy have begun to shift significantly. This shift represents an essential adaptation to the new realities already described — a receding Soviet threat and a declining defense budget. Our assessment of the emerging world order suggests that meeting the demands of our global military objectives with fiscally constrained forces based largely within CONUS will continue to be an enormous challenge. Our fundamental strategy concepts to meet that challenge are shown in Table 2-2 on the following page and described in the subsequent paragraphs.

Deterrence

First and foremost among our central military strategy concepts, deterrence must continue to be the motivating and organizing concept for America's Armed Forces. This is a choice of great consequence. While avoiding the enormous offensive capabilities required for an aggressive posture more suited to hegemonic nations, a strategy of deterrence,

The Role of US Armed Forces

Table 2-2. Central Military Strategy Concepts

☐ Nuclear and Conventional Deterrence	☐ Collective Security
☐ Crisis Response Through Power Projection	☐ Maritime and Aerospace Superiority
☐ Forward Presence	☐ Security Assistance
☐ Reconstitution	☐ Arms Control
	☐ Technological Superiority

especially for a nation dependent upon the free flow of commerce for its very survival, demands a military establishment of global scope and great competence. To deter nuclear and conventional aggression and to ensure access to global markets in the face of threats ranging from intercontinental nuclear weapons to local terrorists poses military challenges beyond the reach of virtually any other nation on earth, past or present. Contributing to deterrence are a number of other military strategic concepts, the most important of which are crisis response through power projection and forward presence.

Crisis Response Through Power Projection

As US interests are threatened or as crises evolve, the United States must have the capability to respond to crises through power projection: moving men and machines from US bases and forward deployments to the scene of a crisis quickly enough and in sufficient numbers to field an overwhelming force to influence the outcome. Projecting power in a timely fashion is a demanding, complex operation. Assembling a fighting force at great distances requires ready, mobile forces and an appropriate mix of airlift, sealift, and forward-positioned stocks, as well as the capability to conduct forcible entry into the theater if required. It presupposes maritime superiority and the need to ensure unimpeded transit of the air and sea lanes, assured access to space, and the assistance of other nations to facilitate the vast deployment effort entailed. The concept of power projection provides capabilities that have strategic value well beyond the realm of responding to regional crises. Our capability to project power contributes greatly to deterrence, regional stability, and collective security.

Forward Presence

Over the past 40 years, the day-to-day presence of US forces has been key to averting crisis and preventing war. The military strategy concept of forward presence will be no less important in the future. Forward presence provides visible deterrence, preserves regional stability and crisis-response capability, and promotes US influence and access. Forward presence can take many forms, including but not limited to stationed forces, rotational deployments, access and storage agreements, combined planning and exercises, security and humanitarian assistance, port visits, and military-to-military relations. While

military forward presence will be reduced in the future, the prudent forward-basing and deployment of forces and the pre-positioning of combat and support materiel reduces the burdens of power projection from CONUS. Also, forces accomplishing the forward presence role must have the mobility, support, and training necessary for worldwide employment (strategic agility).

Reconstitution

With the mitigation of a Soviet threat that had driven an unprecedented US peacetime active military strength, we now confront a historically familiar but no less demanding challenge: the military strategy concept of reconstitution. This concept requires us to maintain the capacity to reconstitute a large, competent defense capability in the aftermath of reductions from relatively high force levels. Preserving the potential for timely expansion of air, ground, and (to a lesser extent) maritime forces will require extraordinary foresight in laying away infrastructure, stockpiling critical materials, protecting the defense industrial base, investing in basic science and high-payoff technologies, and constituting Reserve units adaptable to changes in the international security climate. Such a vast national effort involves a strategic construct labeled "Graduated Mobilization Response." It envisions an orchestrated approach to policy, organization, planning, programming, budgeting, and execution. It entails a community of view and close cooperation among a host of Federal, State, and private entities, including corporate planners in the defense industry. In the final analysis, reconstitution may well prove to be the linchpin of America's long-term security.

Collective Security

Forward presence is most effective when it is embodied in the military strategy concept of collective security arrangements. These agreements coordinate common security interests; codify commitments, roles, and responsibilities; enhance joint doctrine and interoperability; and provide integrated command structures. In a future of declining budgets and forward presence, we increasingly will rely on international security relationships to further our global interests. We also must prepare ourselves to fight as part of an *ad hoc* coalition if we become involved in conflict somewhere where no formal security relationships exist.

Maritime and Aerospace Superiority

Control of critical LOCs underwrite the strategy concepts of deterrence, power projection, forward presence, reconstitution, and collective security. Control of these LOCs is a prerequisite to our ability to protect global US interests and is essential for power projection, reinforcement, resupply, and access. Maritime and aerospace superiority gives us the capability to achieve this control and provides the NCA with a wide range of options during peace, crisis, and war.

The Role of US Armed Forces

Security Assistance

The bonds of collective security can be strengthened greatly, particularly with lesser developed nations, through the military strategy concept of security assistance. Dollar for dollar, the return on programs that build indigenous military capabilities and reap incalculable goodwill is far greater than that of monies spent in pursuit of unilateral US capabilities to meet regional objectives.

Arms Control

With the narrowing of US and Soviet security objectives, the military strategy concept of arms control has moved to center stage as a major avenue for bounding uncertainty and reducing the level of military arsenals. We engage in arms control, however, not as an end in itself, but as one means in a coordinated effort to enhance national security. Through arms control agreements and abating the proliferation of high-technology weapons, we seek to reduce military threats to our interests, inject greater predictability into military relationships, and channel force postures in more stabilizing directions.

Technological Superiority

We field the most technologically advanced weapons in the world. This factor partially offsets the need to match potential adversaries' quantitative advantages. The combination of the technological superiority of US military systems and the result of 40 years of preparation to fight a global war has provided us with the capability to effectively contain and counter regional aggression, as is evident to date in Operations DESERT SHIELD and DESERT STORM. We can ill afford to allow the diminished threat of global war to erode our ability or resolve to maintain this technological advantage; a consistently robust R&D effort is the essential requirement to maintain this edge.

ESSENTIAL SUPPORTING CONCEPTS

Supporting the central strategic concepts described above, a number of related elements come into play, representing the consequences of choices and constraints.

Peacetime Engagement

The importance of peacetime measures in deterring aggression and defusing crises will inevitably grow as military resources continue to shrink. As America builds upon a continuing presence in diplomatic, economic, and military realms on a daily basis, the foundation is laid for the sympathetic infrastructure so vital to tomorrow's strategic environment. Visible participation in peacetime serves the purposes of detection, nation-building, influence-building, deterrence, and promoting stability, which can obviate the need for military response and complement its effectiveness should deterrence fail.

Counternarcotics. One element of peacetime engagement is the detection and countering of the production and trafficking of illegal drugs. This is a high-priority national security mission for our Armed Forces. It will require a sustained deployment of properly trained and equipped forces for the foreseeable future.

Counterterrorism. The proliferation of international terrorist organizations, whose activities are often conducted beneath the umbrella of state sponsorship, poses a pervasive threat to the civilized conduct of international affairs. It remains a continuing mission within peacetime engagement for the Department of Defense to deter terrorist attacks on US and allied citizens and property, respond effectively to terrorist incidents, and mitigate the effects of international lawlessness. This calls for a military force manned, equipped, and trained to monitor terrorist training and movements, anticipate vulnerable targets for terrorist acts, and respond effectively to neutralize the threat and bring the perpetrators to justice.

Timely Response

Given the shrinking flexibility born of fewer resources and reduced forward presence, a strategy hinged on deterrence and crisis response through power projection is critically dependent on timely action. Such dependence entails a number of subsidiary requirements, including a global indications and warning net for early alert to impending crises; a fail-safe C³ system for rapid, efficient employment of limited assets; and forces, plans, and presence carefully tailored to regional priorities and objectives.

Measured Response Options

Operational planning must account for a wide spectrum of crisis onset conditions, from slow-rising to virtually no warning. Given the overriding importance of timely response, operational plans also must include a wide variety of response options to facilitate early political decision. At the same time, options must be available for effective response to fast-building crises that limit or preclude the latitude for deterrence signalling. While expecting to contain the conflict and to limit it to conventional means, we must plan to execute appropriate deterrent measures to defend US interests and take other actions as necessary outside the region to ensure success. In light of the potential for escalation — increasingly because of the proliferation of advanced weapons and technology — operational planning will include de-escalation options and identify at early stages the terms required to end conflict.

Warning Time and Political Authority

The importance of accurately defining the relationship between the conditions of crisis onset and the military response cannot be overemphasized. Judgments about warning time and the receipt of political authority to call up Reserves and draw on civil lift

The Role of US Armed Forces

assets are pivotal with respect to military concepts of operation, risk assessment, and force levels and their costs. In the past, operational planning assumptions and resource programming analyses have treated warning and political decisions as single events along the timeline of a major developing crisis. The realities of the emerging world order have resulted in a refinement to the process. Thus, in the future, for a given regional threat, operational concepts will be developed and alternative force level analyses will be conducted to account for four conditions of crisis onset: (1) slow-building crises; (2) fast-rising crises; (3) imminent conflict; and (4) conflict. This approach will illuminate the relationship between cost and risk as a function of assumptions about warning and political decision time. It will allow a far more precise array of options for decisionmakers in resource allocation and theater campaign planning.

FORCE CONSTRUCT

The following paragraphs outline four military force packages backed up by four basic military supporting capabilities. Together, these eight elements describe a set of force structure and capabilities for the 1990s and beyond. This concept is tailored to estimates of the capabilities of real or potential adversaries, takes into account the easing of overt East-West confrontation, acknowledges the support of friends and allies as well as the increasing likelihood of concerted multinational action to resist aggression, assumes the realization of arms control agreements and objectives, and hedges against the considerable uncertainty that is likely to plague the international security environment well into the next century. The force packages and supporting capabilities required are summarized in Table 2-3.

Table 2-3. Military Force Packages and Basic Military Supporting Capabilities

MILITARY FORCE PACKAGES	BASIC MILITARY SUPPORTING CAPABILITIES
☐ Strategic Forces	☐ Transportation
☐ Atlantic Forces	☐ Space
☐ Pacific Forces	☐ Reconstitution
☐ Contingency Forces	☐ Research & Development

Military Force Packages

Strategic Forces. The strategic Triad of ICBMs, SLBMs, and land-based bombers will continue to be necessary to deter nuclear aggression. Whatever the success of current and prospective arms control agreements, the reality of strategic nuclear arsenals will be with us for decades to come. Indeed, the number of nations with long-range nuclear weapons will very likely increase. Therefore, under even the most optimistic assumptions about future US-Soviet political relations, our nation requires a capable strategic Triad of survivable systems sufficient to deter any potential adversary, even while contributing to crisis stability and facilitating reductions to the lowest feasible levels.

Other strategic forces considerations are equally important. First, conventional strategic bombers join with other land- and sea-based airpower to form a spectrum of capability covering nearly every conceivable mission. This capability argues even more forcefully in favor of the ongoing modernization of manned bombers. Second, the success of SDI research offers an unprecedented opportunity to remold the US-Soviet strategic nuclear relationship into one of mutually assured defense. Although sharply lower numbers of delivery vehicles and warheads make impossible a disarming first strike against diversely based forces, effective defenses against ballistic missile attack would greatly enhance stability and provide high-confidence protection against accidental or limited strikes.

Atlantic Forces. US interests in the Atlantic Region, including Europe, the Mediterranean Sea, the Middle East, and SWA, require a continuing commitment. We must maintain forward presence and the ability to project power quickly and effectively. The Atlantic is a diverse region. Consequently, US air, land, and maritime forces must still be postured to sustain a viable European security collective, to ensure uninterrupted access to the oil resources of the Persian Gulf, and to meet American commitments to the security of key friends and allies in the volatile reaches of the Middle East and SWA. The nature of the most likely threats in this region dictate the need for continued reliance on highly mechanized and armored ground forces capable of prevailing against a similarly armed opponent, naval forces capable of establishing and maintaining sea control while projecting power ashore, amphibious forces capable of conducting forcible entry operations, and air forces that can achieve air superiority and successfully conduct other missions in support of theater commander objectives. Further, although available to other areas, the bulk of the nation's Reserve forces would augment and support the Atlantic Region.

In Europe, the long-term effects of negotiated reductions and constraints on force posturing will greatly mitigate the incipient threat. The NATO allies can safely resort to greater reliance on Reserve forces, reconstitution strategies, and smaller active forces. Nonetheless, an integrated NATO command structure — with well-trained and well-equipped combat units — is essential to deter or hedge against a hostile turn of events as well as to remain prepared for more limited-objective hostilities. The end of the Cold War will greatly relieve the burden of the US contribution to NATO, but prudent self-interest in support of a growing economic stake in long-term European stability requires a tangible commitment of US military strength.

The Persian Gulf crisis has provided an unparalleled test of our capability to respond rapidly to a severe threat at a great distance. Every facet of our post-Cold War strategy for a major regional contingency response has been exercised: force size and mix; equipment durability; pre-positioned stocks; mobility assets; and adaptive planning tools. To deter future potential aggressors and, if necessary, counter threats to the security of this vital region, a modest level of presence must be maintained. After the successful completion of Operation DESERT STORM, the size and shape of our forward presence forces will be determined by the desires of our regional allies and the uncertain future. Our goal for long-term commitment to the area includes a mix of an enhanced maritime presence,

The Role of US Armed Forces

established capabilities for the rotation of selected air forces, pre-positioning of key material, and frequent combined exercises by all of our military components. While this goal will significantly reduce US forces on the ground in SWA, the size of today's force commitment and the unknown security climate may indicate that a headquarters element be maintained for the foreseeable future. Our continuing future interests in the region underscore the need to preserve and enhance a core of mobile, flexible, highly trained, and ready armored and mechanized divisions that can deploy — and arrive ready to fight — on short notice. That force must be accompanied or preceded by equally ready and capable air, maritime, and light ground units, able to deter or defend and provide secure LOCs for the introduction of heavy ground forces.

Pacific Forces. US interests in the Pacific Region, including Southeast Asia and the Indian Ocean, require a continuing commitment to this part of the globe as well. The tasks for US military forces in the vast expanse of the Pacific Ocean and its littorals differ from those in the Atlantic arena. The primary requirement in this region of major maritime interest is to maintain forward presence for deterrence, regional stability, and crisis response, as well as to further US influence. The singular overt threat of North Korea is familiar; this threat is well-hedged with expanding ROK capabilities and the still-necessary bulwark of in-place and reinforcing US forces. The nature of the region, the day-to-day regional stability mission, and the most likely threats indicate the continuing need for forces similar to those in the region today, but with smaller components. Forward presence in this region will be principally maritime, with a smaller number of forward-deployed air and both light and heavy ground forces. The remaining Army and Air Force power in the Pacific would consist of reinforcements from Hawaii, Alaska, and CONUS.

Contingency Forces. In the “come-as-you-are” arena of spontaneous, often unpredictable crises, very rapid response requires fully trained, highly ready forces that are rapidly deliverable, largely self-sufficient, and drawn primarily from the active force structure. Our revised military strategy requires contingency response forces specifically tailored to this challenge. These forces will include:

- ❑ Army airborne, air assault, light, and highly mobile heavy divisions.
- ❑ Navy forward-deployed CVBGs, ARGs, and attack submarines that can be reinforced by additional forces surged from CONUS.
- ❑ Marine expeditionary forces.
- ❑ Selected Air Force capabilities that include long-range conventional bombers.
- ❑ SOF units drawn from all Services.

In regions where no US forward presence exists, these contingency forces are the tip of the spear, first into action, and followed as required by heavier forces and long-term sustainment.

Basic Military Supporting Capabilities

Transportation Capability. In order to meet the commitments of our national interests, reinforce our forward presence, and respond to crises, the United States requires sufficient capability to move substantial quantities of men, materiel, and equipment through the air and over the sea. Significant lift capability also is required to sustain those forces committed to contingencies far from our shores. Pre-positioned equipment, either ashore or afloat, is one response to this need, reducing the requirements for short-notice heavy equipment lift at the time of crisis. However, our strategy requires a capable fleet of flexible and ready airlift and sealift assets.

Space Capability. Effective employment of strategic, Atlantic, Pacific, and contingency forces requires us to maintain an effective space capability. Requirements for early warning, surveillance, navigation, and C³ dictate a wide variety of space systems. Increasing demands for strategic defense and arms control treaty compliance monitoring, as well as emerging tactical requirements, in turn demand ever-more effective spacecraft, as well as their supporting infrastructure, for space support, force enhancement, space control, and force application. More so than ever before, space is the "high ground" that we must occupy.

Reconstitution Capability. Strategic, Atlantic, Pacific, and contingency forces are the bulwark of the nation's security. These forces must be supported by a broad foundation of industrialization, mobilization, and sustainment to give them the enduring support needed for long-term employment. For the near term, the United States needs to retain the option of a relatively rapid reconstitution capability. Trained personnel and existing equipment no longer required for active and Reserve units may be used for this purpose. For the longer term, reconstitution — requiring the generation of new forces — will require adequate time after the initial mobilization decisions to form new units from cadres, the IRR, or possibly from conscripts. Reconstitution capability also requires judicious and prioritized investments in critical technologies, supporting capabilities (such as the Selective Service System and training facilities), and weapon systems; the replacement of costly, technologically superior weapons used in training and in contingency operations is critical. Lastly, this reconstitution capability must rest on a worldwide infrastructure built on mutual security arrangements for access, pre-positioning, and essential services.

R&D Capability. Beyond the requirement for a reconstitution capability is the compelling need for an ongoing and vital foundation of R&D into the technologies, applications, and systems of the future. There can be no false economies in this area. The United States has always relied on technological superiority to offset potential adversaries' quantitative advantages, and we must continue to make prudent investments in this critical area.

The Role of US Armed Forces

Chapter 3. The President's Budget and The Defense Program

HISTORICAL PERSPECTIVE

Over the past several decades, the Department of Defense has spent approximately 61 percent of its annual resources on O&S of forces and about 39 percent on procurement and RDT&E. Figure 3-1 shows the variation in that proportional split over the past years.

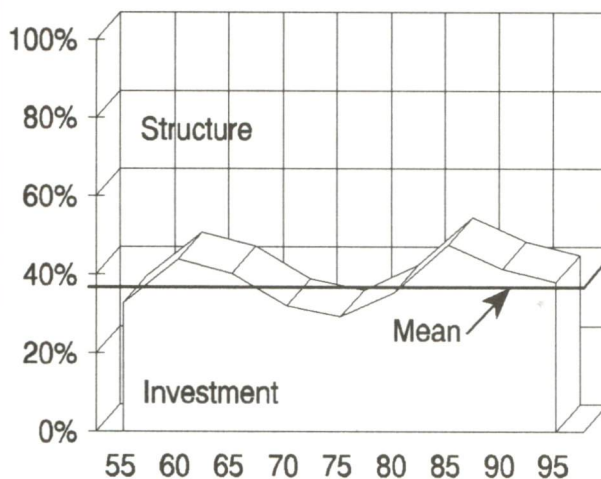


Figure 3-1. Historical O&S and Investment Trends

The strategic environment, strategy, and policy are linked to resources in the Defense Program. This chapter builds on the preceding discussion and describes the trends in force structure and capabilities that will be procured through the resources sought by the President's Budget and the Defense Program.

The most significant subdivisions of O&S funding are shown in Figure 3-2 on the following page. Historically, O&M and military pay funding have consumed most of these resources. Figure 3-3 shows a breakdown of O&M funding into its major subordinate categories. These proportionate averages show that personnel financing consumes the largest share of Defense spending.

Investment funding is subdivided into procurement and RDT&E. Historically, approximately 30 percent of investment funding has been devoted to RDT&E and the

The President's Budget and The Defense Program

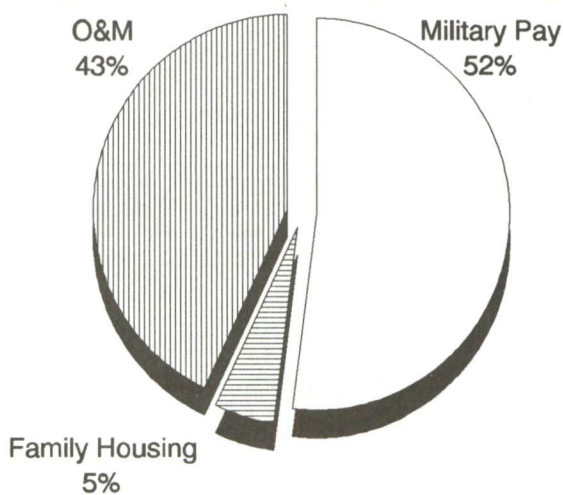


Figure 3-2. Historical O&S Proportion Averages

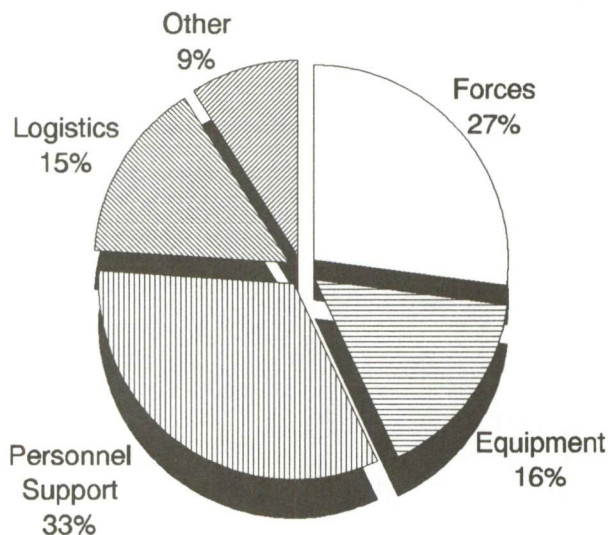


Figure 3-3. Historical O&M Proportion Averages

remainder to procurement. A telling statistic is that nearly 60 percent of RDT&E resources have been spent on strategic systems, including strategic defenses. On the other hand, over 75 percent of procurement monies have gone to equipment for general purpose forces. Figures 3-4 and 3-5 show the respective proportionate shares of these major subcategories.

Expressed in FY 1991 dollars, the DOD BA has been on a downward trend since 1985. Figure 3-6 on page 3-4 shows the recent history of this trend, as well as projected BA levels.

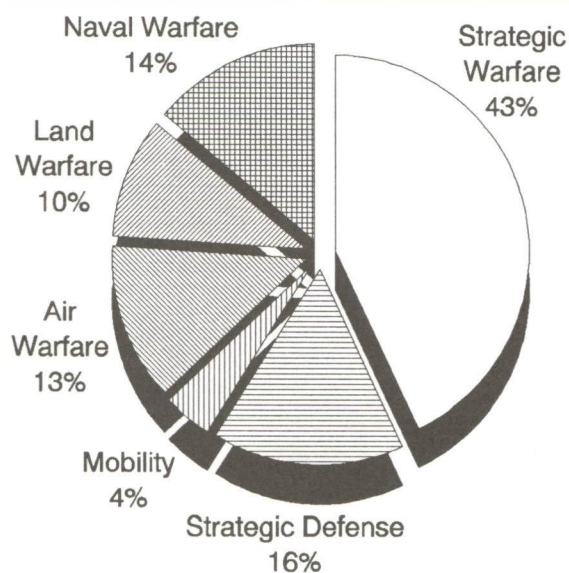


Figure 3-4. Historical RDT&E Proportion Averages

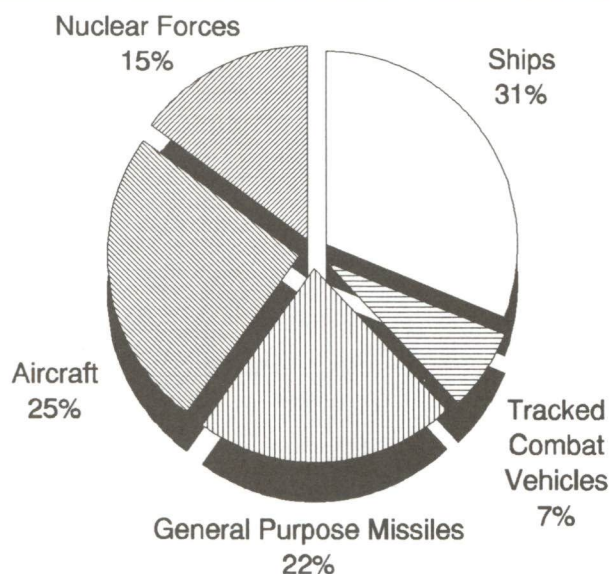


Figure 3-5. Historical Procurement Proportion Averages

THE PRESIDENT'S BUDGET AND THE DEFENSE PROGRAM

Funding

The President's Budget requests \$278.3 billion for FY 1992 and \$277.9 billion for FY 1993. An examination of the trend line in Figure 3-6 on page 3-4 shows that resource requests continue to drop through the end of the Defense Program in FY 1997, to a level below \$240 billion in constant FY 1991 dollars.

The President's Budget and The Defense Program

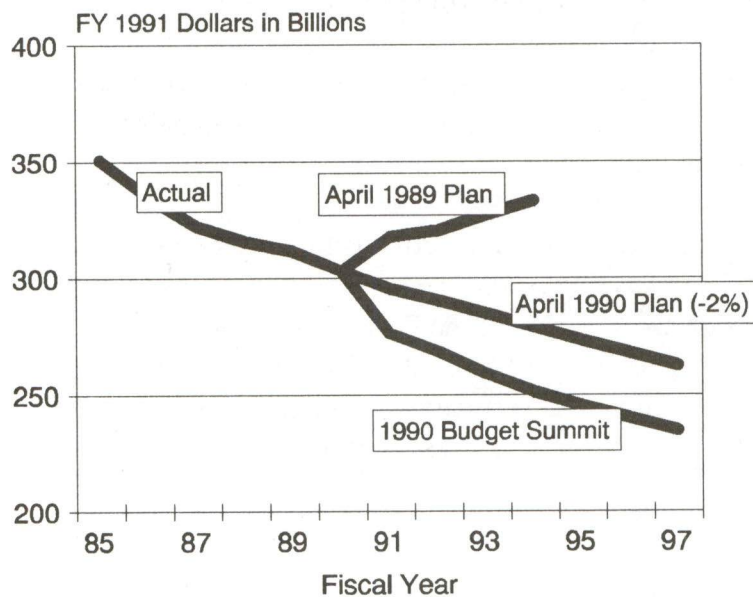


Figure 3-6. BA Trends

Despite the restructuring of forces planned over the Defense Program, the overall percentages of resources devoted to investment and O&S remain very close to their historical averages of 39 and 61 percent, respectively. However, this generalization masks significant differences among Service programs.

Investment funding constitutes only 21.7 to 23.4 percent of the Army program through FY 1997, a range close to the Service average. The corresponding relatively high O&S figure reflects the manpower-intensive nature of most Army units, but it also shows the Army's commitment to maintaining the readiness of combat units through high OPTEMPO, Combat Training Center activities, and CJCS exercises. However, within the investment accounts, the Army devotes a higher-than-average share of between 30.4 and 44.6 percent to RDT&E to protect next-generation weapon systems. The remaining procurement component of investment funding is significantly lower than Service historical averages, reflecting the judgment that current and contracted systems deliveries will be sufficient to equip the reduced force structure during the remainder of the decade, because of reduced threat and risk.

Navy and Marine Corps investment shares remain very close to their historical average of 39 percent of the total program. The proportionate share of RDT&E to procurement likewise remains close to the historical allocation. However, the Navy has made significant shifts within the O&M resource; this funding ranges from 46.8 to 48.8 percent over the period of the Defense Program. This change reflects the Navy's commitment to high OPTEMPO for the reduced force structure.

The Air Force investment program averages 47.4 percent across the Defense Program period, continuing the Air Force's emphasis on weapon systems innovations and

modernization. Like the Army, the Air Force has deferred procurement in the near term while funding RDT&E to higher levels to ensure the continued development of next-generation strategic and tactical systems. Generally, the Air Force continues to trade force structure for modernization, preserving a flexible and modern force capable of absorbing new systems in response to future needs.

USSOCOM, unique among the unified and specified commands, exercises its own planning and programming authority. This is accomplished through Military Force Program-11 and makes up approximately 1 percent of the Defense Program. Specific budgeting and procurement, however, is accomplished by the Military Services. The focus of SOF funding is the attainment of validated force structure, modernization of aging weapon systems, improvements to enhance readiness, and procurement of support equipment for sustainability.

Forces

Figures 3-7 through 3-10 summarize the forces proposed for the Defense Program. FY 1986 figures are provided for trends consideration, and FY 1991 data are the current force levels.

Over the Defense Program, all major elements of the strategic Triad are reduced from current levels. US Army end strength (AC and RC) is reduced nearly 27 percent, while naval surface combatants decline by 10 percent. The Marine Corps is reduced about 18 percent, and Air Force TFW equivalents (AC and RC) shrink by about 24 percent.

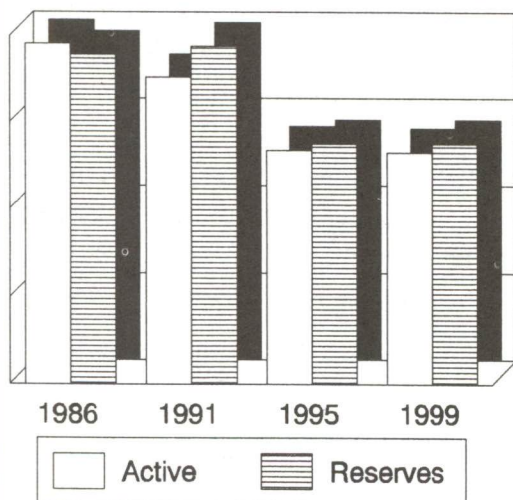


Figure 3-7. US Army End Strength Trends

The President's Budget and The Defense Program

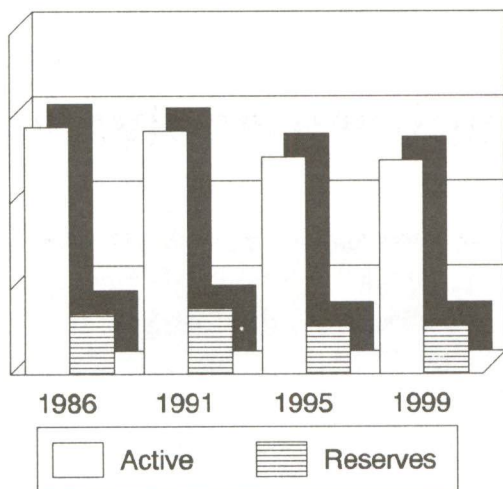


Figure 3-8. US Navy End Strength Trends

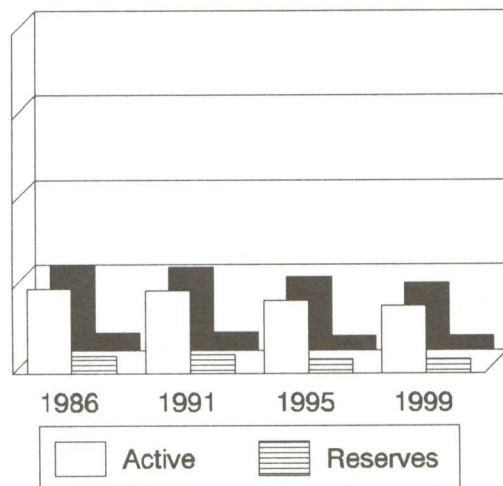


Figure 3-9. US Marine Corps End Strength Trends

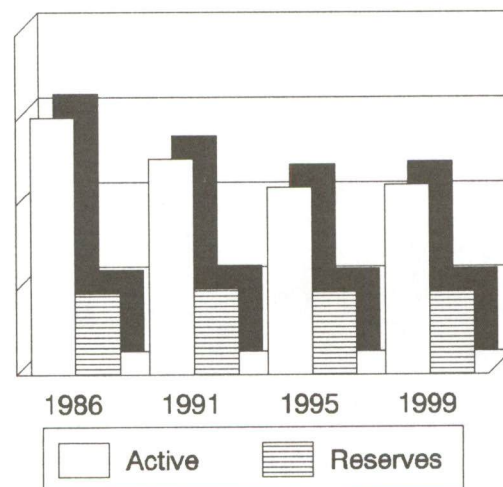


Figure 3-10. US Air Force End Strength Trends

Part II.

Forces and Capabilities Analyses

1991 JMNA

Chapter 4. Forward Presence

GLOBAL REQUIREMENTS AND CAPABILITIES

Forward presence requirements have been affected by the emerging new world order described in Chapter 1. Economic competition is replacing the Cold War as the most important challenge to the American way of life; the collegiality of long-time allies will be stressed as competition for scarce resources increases while the Third World will remain racked by regional problems and economic chaos. The United States must choose where it will assist and where it will remain distant.

Forward presence of US ground, maritime, and air forces contributes to US global access and influence. It promotes stability by demonstrating our will to honor commitments and protect interests. This presence also deters conflict and controls escalation should deterrence fail. Effective presence forces must be flexible with regard to alternative basing, operating areas, and time-on-station requirements.

The contribution made by military presence in furthering US interests is fundamental to the national security strategy. Because of reductions in traditional threats and increases in allied capabilities, as well as political and fiscal factors, the United States will commit fewer forces to permanent forward bases in the future. Forward presence must be accomplished through a flexible mixture of forward basing, forward deployment, exercises, military assistance, visits, disaster relief, nation-assistance and peacekeeping efforts, access agreements, logistic arrangements, supporting lift, and exchanges.

Maritime Presence

The presence of maritime forces provides a clear message concerning US regional interests and fosters regional stability. During a crisis, offshore presence shows US commitment while allowing mobility and flexibility. The access and influence provided by maritime units visibly affirms the United States as a maritime power that can freely use international waters and

MAJOR MARITIME FORCES AVAILABLE FOR FORWARD PRESENCE

- ❑ CVBGs
- ❑ Surface combatants
- ❑ MAGTFs with amphibious shipping

Forward Presence

airspace to achieve foreign policy objectives. These forces also provide the NCA with the flexibility to deploy for stability operations or timely crisis response. Over the period, the forces available for forward presence are projected to decrease.

Land-Based Presence

The forward presence of air and ground forces sends explicit signals about the firmness of US commitment in a region. These forces seek to deter adventurism and provide an enhanced infrastructure on which to build expanded capabilities when required. Land-based ground and air forces demonstrate a physical involvement and make a statement of political will to provide additional forces to defend vital interests. The access and influence provided by these forces visibly reaffirm the United States as a global power with global reach. The effectiveness of forward-based air and ground forces is enhanced by units conducting worldwide deployments for training and exercises with allied and friendly nations. Over the period, these forces are projected to decrease.

MAJOR AIR AND GROUND FORWARD PRESENCE FORCES

- ☐ TFWs
- ☐ Corps, divisions, ACRs, and separate brigades

REGIONAL REQUIREMENTS AND CAPABILITIES

Europe

In Europe, the role of a unified Germany, the Soviet troop drawdown, stability in Eastern Europe, and NATO's future are current issues. NATO's role is changing, and the European Community is extending its economic influence into Eastern Europe and the Soviet Union. Forward presence trends in Europe are shown in Figure 4-1.

Acknowledging the dramatic changes sweeping Europe and the Soviet Union, the Defense Program significantly reduces US forward presence in the region. Although land-based forces are being reduced, the remaining force is still significant. This continuing presence provides an explicit commitment to the security and stability of Europe; pre-positioned equipment provides an infrastructure for CONUS-based US forces to use should the need arise. Future considerations may work to reduce US presence further. However, US presence should, as a minimum, link US and European interests and ensure the capability to support incoming reconstituted forces.

Maritime presence in the region demonstrates a continuing US commitment to European security. US maritime forces in the Mediterranean provide a force unconstrained by any host nation to respond to crises in the Middle East and deter extremist nations. Naval force posture is sufficient to provide one CVBG and one ARG, with its embarked MEU(SOC), continuously in the Mediterranean Sea or eastern Atlantic Ocean.

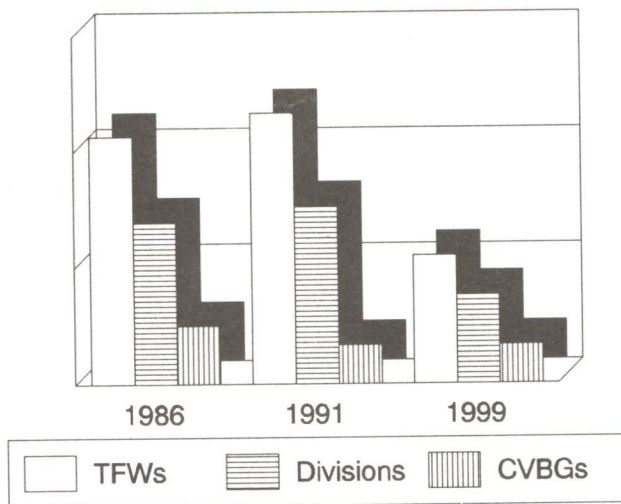
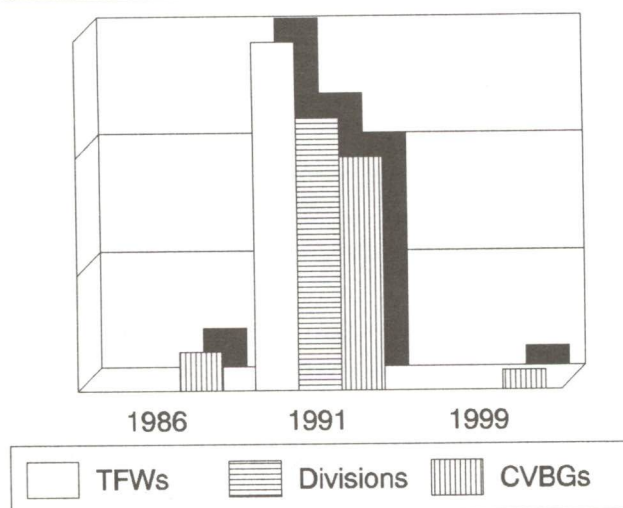


Figure 4-1. Trends in Major Presence Forces in Europe

Southwest Asia

The primary US strategic interests in SWA are the security of key friendly nations and access to Persian Gulf oil. The US response to the Iraqi invasion of Kuwait was facilitated by existing US presence in the region. Air, ground, and maritime deployments and pre-positioning, combined exercises, security assistance, and infrastructure — as well as European and regional en route strategic airlift infrastructure — enhanced the crisis response force buildup. Forward presence trends in SWA shown in Figure 4-2 reflect the current mission in the Gulf but do not suggest a protracted deployment at current force levels.



NOTE: FY 1991 forces reflect Operation DESERT SHIELD deployment.

Figure 4-2. Trends in Major Presence Forces in SWA

Forward Presence

Future US presence in SWA will be defined by the post-conflict balance of power among Iran, Iraq, and an increasingly close coalition of moderate Arab states including Saudi Arabia. While the scope and size of US forward presence will depend on the resolution of the current crisis, this future commitment will be reinforced by pre-positioned equipment, access agreements, coordinated planning, periodic deployments and exercises, visits by senior officials, and security assistance.

Pacific

As Asia moves toward increased political self-confidence and economic prosperity, US forward presence will continue to serve as a strong stabilizing counterweight to undue expansion of any regional nation's power or political assertiveness. However, adjustments to current US regional presence are warranted in light of improved allied capabilities and reductions in tensions. Forward presence trends in the Pacific are shown in Figure 4-3.

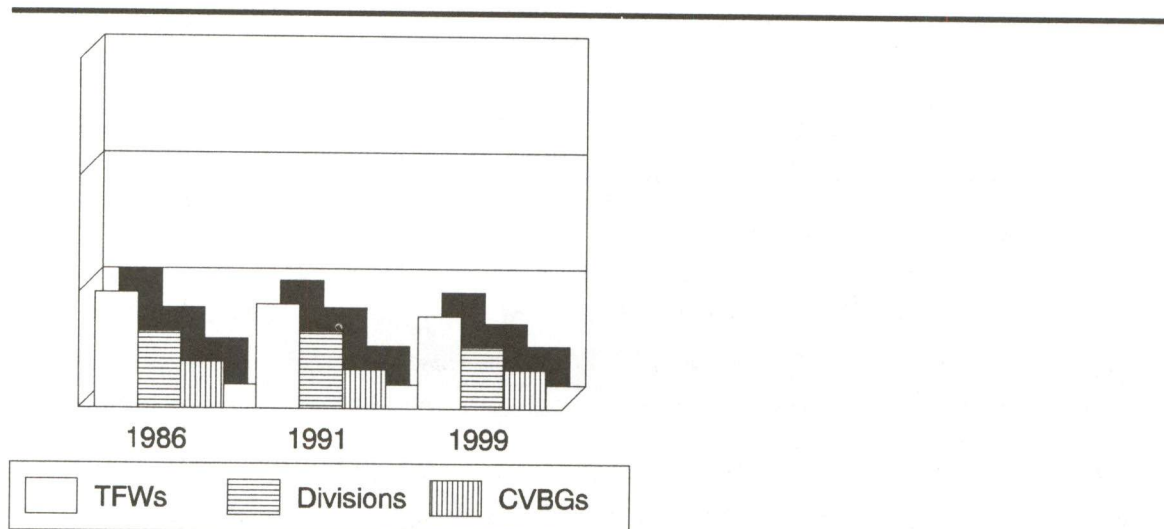


Figure 4-3. Trends in Major Presence Forces in the Pacific

The Defense Program provides sustained presence, represented by maritime forces throughout the region and land-based forces in Korea, Japan, and Hawaii. As Japan and South Korea move toward a leading role in their own defenses, carefully managed reductions of personnel represent a prudent level of risk. However, these forces will continue to support deterrence on the Korean Peninsula while balancing Soviet and Chinese influence in the area. As access to bases such as those in the Philippines is reduced, support to forward presence in the region will have to emphasize increased flexibility. The Defense Program provides for a capability of maintaining one CVBG continuously (operating from Japan) and one ARG and MEU(SOC) for most of each year in the western Pacific.

Latin America

Poor economies, debt, drugs, and social inequities and dislocation will continue to plague Latin America with potential adverse impact on US long-term security interests. US land-based presence in Panama will affirm our commitment to regional stability until the forces depart at the end of the decade. Increasingly, the best means to achieve US security objectives in this region will be port visits, routine airlift routes, international military education and training, and bilateral exercises. Military civic and humanitarian action that is not linked to low-intensity conflict or counterinsurgency operations will also be valuable. Forward presence trends in Latin America are shown in Figure 4-4.

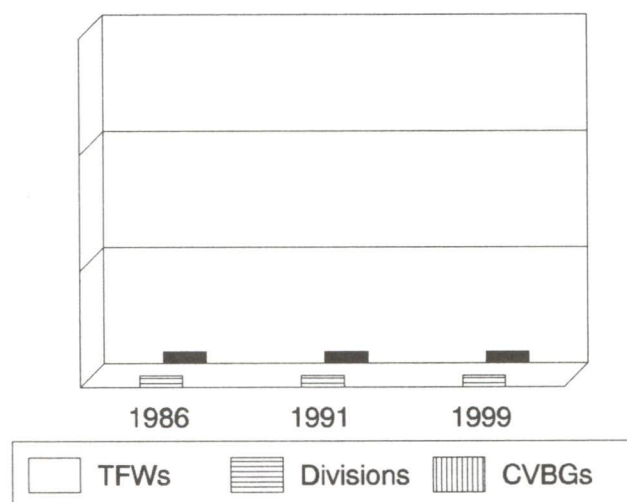


Figure 4-4. Trends in Major Presence Forces in Latin America

As long as domestic illegal drug demand continues, the interdiction of drug trafficking will remain a US focus in Latin America. Forces assigned to CN operations may serve to enhance US forward presence and influence. However, in our pursuit of the CN objective, we must be conscious of each nation's sovereignty and of regional concerns over the level of US involvement.

Other Regions

Debt, poverty, fragile democracies, arms proliferation, and internecine struggles will have an increasing influence on US interests around the world. As the Third World ceases to be an East-West ideological battleground, US political interests will be focused on the impact that regional instability and conflict have on our security and the free flow of commerce. The sudden, explosive nature of frustrated ethnic, religious, political, and social forces will continue to have an increasing impact on regional and international affairs. The long-term interests of the United States are best served by supporting a process of democratization and economic improvement before a crisis breaks out. As a

Forward Presence

result, the United States relies on a military presence in these regions to provide positive influence without exacerbating underlying nationalistic frustrations. This presence must be responsive and flexible over a widening area of responsibility; the United States cannot — nor should it — be everywhere at all times. In short, US presence will depend increasingly on periodic regional deployments, often for exercises combined with security assistance and civic action goals.

TRENDS AND DEFICIENCIES

The future trend is toward a US forward presence versus a forward defense. Forward presence is less intrusive in its deployments and more flexible in its response to unexpected requirements, increasingly the key to effective crisis response. For example, as noted earlier, our response to the invasion of Kuwait was facilitated by existing US presence in the region. However, future forward presence forces will also require a more flexible and credible deployment capability. Currently the major deficiency in our ability to respond to crises outside central Europe is the limited ability to respond rapidly with heavy ground forces; this is a forward presence and mobility shortfall as well. This deficiency is exacerbated by reductions in amphibious lift that limit maritime forward presence and crisis response capability. We should pursue a balanced mobility program that provides sufficient strategic lift and pre-positioned equipment to bolster forward presence and crisis response capabilities. Future mobility requirements are being determined by a congressionally mandated Mobility Requirements Study currently under way.

Reductions in foreign base and access rights are a cause for concern. Operations DESERT SHIELD and DESERT STORM reinforced the importance of en route basing and overflight rights outside CONUS in supporting the strategic transportation system. Once support facilities or access rights are conceded, regaining them in time of crisis will be difficult, greatly affecting deployment efforts.

CONCLUSIONS

In view of ongoing changes in the international security environment and the significant decline of the Soviet threat — and with the impending change in our strategy from forward defense to forward presence — our forward presence forces and the ability to project power rapidly will be increasingly important. US fielded forces through FY 1999 provide sufficient forces to accomplish US national security objectives. However, there are risks. If forward presence is reduced beyond projected levels, there may be a perceived loss of US interest, reduced influence, and the loss of infrastructure in critical regions.

Chapter 5. Force Generation Potential

MOBILIZATION DOCTRINE AND PLANNING SYSTEM

The US mobilization doctrine and planning system provides the capability to respond to early, ambiguous, and specific warnings. GMR provides decisionmakers with courses of action to enhance deterrence, mitigate the impact of an event or crisis, and reduce significantly the leadtime associated with mobilization. GMR planning and execution initiatives are divided into three stages: preparation and planning, crisis management, and national emergency and war. Preparation and planning initiatives ensure that appropriate standby authorities, legislation, and national security emergency preparedness planning measures are in place and are maintained for use during a crisis or war. The crisis management stage produces decision packages and policy recommendations. The national emergency and war phase produces emergency response measures and further policy recommendations. The GMR capability can be applied across a spectrum of contingencies ranging from natural disasters to force reconstitution.

The emerging international environment and our enduring defense needs dictate a defense strategy based on fewer forces. With Soviet force withdrawals from Europe well under way and significant reductions planned in US active and Reserve forces, planning for the possibility of a resurgent threat in Europe or large forces elsewhere is essential. This chapter focuses briefly on graduated mobilization response and long-term US force reconstitution against a renewed global threat. It then considers in greater detail US technology and industrial base capability, our ability to generate and train manpower, and the adequacy of emergency authorities.

LONG-TERM FORCE RECONSTITUTION

Recent historic changes in Europe have led to significant reductions in NATO and the Warsaw Pact. Under pressure to produce a "peace dividend," NATO allies have moved to lower force levels with concomitant reductions in defense-related technology and production base capabilities. At the same time, it is clear that the Soviet Union continues to modernize its forces. Although actual production levels remain to be seen, the Soviet Union possesses a substantial production base and will pursue technological advantages. If the Soviet Union reversed its course, it might take them several months to years to

Force Generation Potential

fully mobilize and reconstitute a force comparable to levels existing before unilateral and CFE reductions. The combined industrial might of the United States and its allies could, given prudent peacetime industrial base strategies and policies, muster sufficient capability to either deter or defend against a Soviet attack. In arriving at this assessment, several pertinent assumptions were made for each side. The prime assumption is that conflict does not occur for at least 24 months. Other assumptions are that equipment in storage has been maintained, only available production facilities are used, no down-time results from relocation of production capabilities, and funding is unconstrained.

The Soviet production rates and yearly industrial capacity far outweigh that of the United States. As defense spending is reduced in the United States and the Soviet Union, industries critical to defense will disappear or will have to move into commercial markets to survive. Therefore, we must continually monitor our ability to maintain technological superiority in those areas critical to our capability to deter and fight and to meet reconstitution and regeneration targets.

US TECHNOLOGY BASE

Future US military superiority and our capability to deter attack depends on our continued ability to identify and support militarily important technologies and quickly field technologically advanced weapon systems. Currently, no country is ahead of the United States in any overall area of technology. However, timely production using innovative technologies has become a serious problem. The United States often lags behind foreign countries in incorporating the latest technological advantages into its fielded products. The ability to make effective use of emerging technologies is critical.

The Pacific Rim countries, the European Community, and the Soviet Union are challenging US leadership in defense-related technologies. The emergence of international defense consortiums has increased our use of foreign technology. Table 5-1 summarizes an assessment of foreign technological capabilities relative to those of the United States in the 20 critical technologies identified by the Department of Defense. This table shows the Soviet Union with significant leads in some areas of pulsed power and Japan significantly ahead in some areas of machine intelligence and robotics, photonics, semiconductor materials and microelectronic circuits, superconductivity, and biotechnology. A Department of Commerce report, "Emerging Technologies: A Survey of Technical and Economic Opportunities," documented 12 emerging technologies that will have a major economic impact in the next decade. This report states that "... if current trends continue..., before the year 2000, the United States could lag behind Japan in most emerging technologies and trail the European Community in several of them." Table 5-2 on page 5-4 shows the current and predicted US standing in emerging technologies relative to Japan. Currently, although Japan and the Soviet Union lead in some areas within specific technologies, the United States is ahead or even in R&D of these technologies. If these trends continue, however, many countries, including potential adversaries, may threaten US technological superiority in many areas of potential military significance.

Table 5-1. Summary of Critical Technological Capabilities

Critical Technologies	Soviet Union	NATO Allies	Japan	Others
Air-breathing Propulsion	■ ■	□ □ □	□ □	
Composite Materials	■ ■	□ □ □	□ □ □	□ □ □ Israel
Machine Intelligence/Robotics	■	□ □ □	□ □ □ □	□ □ Finland, Israel, and Sweden
Passive Sensors	■ ■	□ □	□ □	
Photonics	■ ■	□ □	□ □ □ □	
Semiconductor Materials and Microelectronic Circuits	■	□ □	□ □ □ □	□ □ Israel
Sensitive Radars	■	□ □	□ □	□ □ Sweden
Superconductivity	■ ■	□ □	□ □ □ □	□ □ □ Switzerland
Biotechnology Materials and Processes	■ ■	□ □ □	□ □ □ □	□ □ Various
Computational Fluid Dynamics	■	□ □	□ □	□ □ Sweden and Israel
Data Fusion	■ ■	□ □	□ □	□ □ Israel
High Energy Density Materials	■ ■ ■	□ □ □	□ □ □	
Hypervelocity Projectiles	■ ■ ■	□ □	□ □	
Parallel Computer Architectures	■	□ □	□ □	□ □ Switzerland, Israel, and Hungary
Pulsed Power	■ ■ ■ ■	□ □	□ □	
Signal Processing	■ ■	□ □	□ □	□ □ Sweden, Israel
Signature Control	■ ■	□ □	□ □	
Simulation and Modeling	■	□ □ □	□ □ □	
Software Producibility	■	□ □	□ □	□ □ Various
Weapon System Environment	■ ■ ■	□ □ □	□ □	

LEGEND

Position of Soviet Union relative to United States:

- ■ ■ ■ Significant leads in some niches of the technology
- ■ ■ Generally on a par with United States
- ■ Generally lagging except in some areas
- Lagging in all important aspects

Position of others relative to United States:

- □ □ □ Significant leads in some niches of the technology
- □ □ Generally on a par with United States
- □ Generally lagging except in some areas
- Lagging in all important aspects

US INDUSTRIAL BASE**General**

The United States presently has a significant industrial base potential for force reconstitution. However, there are concerns about the continued vitality and responsiveness of our resource base and the ability to compete with foreign countries. The size and structure of the relevant industrial base is driven by defense investments, but the Defense Program (in constant dollars) will decline by 10 to 12 percent from FY 1992 through

Force Generation Potential

Table 5-2. Relative Standings in Emerging Technologies (US vs. Japan)

TECHNOLOGY	R&D (Current/Future)	PRODUCT INTRODUCTION (Current/Future)
Advanced Materials	Even/Losing	Behind/Losing
Advanced Semiconductor Devices	Even/Holding	Behind/Losing
Artificial Intelligence	Ahead/Holding	Ahead/Holding
Biotechnology	Ahead/Losing	Ahead/Losing
Digital Imaging Technology	Even/Losing	Behind/Losing
Computer-Integrated Manufacturing	Ahead/Holding	Even/Holding
High-Density Data Storage	Even/Holding	Behind/Losing
High-Performance Computing	Ahead/Holding	Ahead/Losing
Opto-electronics	Even/Holding	Behind/Losing
Sensor Technology	Ahead/Losing	Even/Holding
Superconductors	Even/Losing	Even/Losing

Source: DOC "Emerging Technologies" Report

FY 1997. Some key programs — the M1 tank, M2 and M3 fighting vehicles, F-15 and AH-64 aircraft, PEACEKEEPER Rail-Garrison, TRIDENT SSBNs, and several types of precision-guided munitions, among others — will be terminated or kept at minimum sustaining production rates. Defense contractors will likely downsize, diversify, be purchased by foreign firms, or cease operation, virtually eliminating excess and timely expansion capacity.

Increased global competition is also a concern. Europe is moving quickly toward economic unification. The Pacific Rim nations are expanding economically and pose a serious challenge to the competitiveness of US industries in the global electronics and armaments markets. Because many investors perceive that defense industries operate in an unstable, complex environment characterized by high risk, restricted cash flow, and low returns, investment in these industries is shrinking. Funding the investments in industrial research, productivity, and modernization that the United States needs for the future is beyond the capability of defense industry alone.

A final concern involves our increasing reliance on foreign sources. Such reliance must be addressed by policies that link national military strategy and implicit national industrial strategy to ensure the availability of the industrial and technological resources on which US national security relies.

Major System Suppliers

Because of commercial demands, the missile, electronics, and aircraft industries, while reduced in size, will continue to maintain a supply base and production capability. In the future, the number of major contractors for shipbuilding, nuclear power propulsion

units, and combat vehicles may shrink to unacceptably low levels. The number of active primary shipyards increased from 25 in FY 1980 to 27 in FY 1982, but it has steadily declined since then to 16 in FY 1990. The last commercial contract vessel built in this country was completed in 1987, making this sector totally dependent on DOD investments. In addition, the United States could possibly have only one prime contractor each for submarine and combatant ship construction by the mid-1990s. No new nuclear power propulsion plant construction is planned in the near future, and today's plants will be reaching the end of their useful lives between 2000 and 2010. Decreased defense spending also may reduce the six prime contractors in combat vehicle production. Although all six contractors also deal in the commercial sector, they depend on defense contracts for about 25 percent of their revenue. The projected end of the M2 and M3 fighting vehicle and M1 tank programs will impact on this sector, especially as labor skills are lost.

Subtier Suppliers

The loss of subtier suppliers — manufacturers of subsystem components of larger systems — is a threat to our ability to field state-of-the-art weapon systems on a timely basis. The impact of reduced DOD spending is apparent in this area. For example, a recent study showed that over 50 percent of military aircraft production is subcontracted. At the same time, production capability in such essential subtier industries as machine tools, gears, optics, bearings, castings, and forgings has declined, in some cases to the point where sufficient domestic capacity may no longer exist. Examples of the low numbers of firms supplying selected items are shown in Table 5-3. We do not have either the authority or the resources to ensure that even this level of infrastructure will remain in the future.

Table 5-3. Suppliers of Selected Military Items

Product/Item	Number of Suppliers	Product/Item	Number of Suppliers
Airborne radars	2	Titanium sheeting	3
Aircraft engines	2	Titanium wing skins	2
Aircraft landing gear	3	Titanium extrusions	1
Aircraft navigation systems	2	Optic coatings	1
Infrared systems	2	Needle bearings	2
RPV/Missile/Drone engines	2	MILSPEC-qualified connectors	3
Gun Mounts	2	Radomes	2
Doppler navigation systems	2	Image converter tubes	1
Aluminum tubing	2	Specialty lenses	2

Foreign Suppliers

We have become increasingly dependent on foreign sources for essential manufacturing know-how and the production of key components. This condition raises two concerns.

Force Generation Potential

The potential vulnerability of foreign sources is one issue. US manufacturers must look for the highest quality at the lowest cost, which often means buying components overseas. Foreign nations exercise considerable control over their economies and producers, and they may take actions that are inconsistent with US national security interests. A recent Joint Logistics Commanders' study suggested that if foreign sources were unavailable in a crisis, accelerated US production of key weapon systems (such as the M1 tank, AIM-7 missile, sonobuoys, and F/A-18) could continue for only 2 months. It would then take 6 to 14 months before US sources could supply industries with the critical components and materials for continued production. Examples of heavy dependence on foreign sources are automated, multifunction machine tools; precision ball bearings; computer chips; and precision optics. Much of this dependence is irreversible; thus we must carefully monitor foreign content in order to ensure that dependence does not become a vulnerability.

The second concern, erosion of the US base, relates to foreign sourcing. Should technology and product development continue to migrate offshore, US capabilities will continue to erode. The longer this situation persists, the more costly and difficult it will be to regenerate lost capability. As noted above, insistence on domestic sources for US defense systems may not always be prudent, but the United States must maintain access to needed materials and production means.

Industrial Expansion

Shifting the current domestic industrial base to large-scale production of military-related systems will take time. By end-FY 1997, it is estimated that it would take 2 to 4 years to restore production capability to 1990 levels for items whose lines have gone "cold." Outdated facilities, fewer prime contractors and subtier suppliers, increased foreign sourcing, reeducation of a production work force, and manufacturing equipment leadtimes will combine to reduce the capability of industry to convert rapidly to military production and expand to emergency operating capacity. Therefore, we must continually monitor our ability to meet reconstitution targets. In those instances where we fall dangerously below our own targets and this is deemed unacceptable for national security, steps should be taken to correct the situation. As an example, Table 5-4 describes typical peacetime leadtimes for aircraft components. These leadtimes could be expected to increase as defense spending declines, causing the subtier base to erode further.

INVESTMENT STRATEGY

For several decades, private industry has been increasing its expenditures on R&D faster than the Department of Defense. R&D spending by US industry has quadrupled since 1960 in real terms, while real defense R&D spending has increased by less than half. In 1960, defense accounted for one-half of US R&D spending, but by 1990, this

Table 5-4. Waiting Time for Aircraft Components

Aircraft Components	Average Lead Time (months)	Aircraft Components	Average Lead Time (months)
Auxiliary power units	27	Wings	27
Radars	27	Actuators	21
Avionics	24	Empennage	29
Landing gear	28	Castings	10
Wheels & brakes	21	Forgings	15
Nacelles	21	Ejection seats	18

fraction had shrunk to one-third. This long-term relative decline occurred despite the defense buildup of the 1980s. Even more striking is the decline in the DOD share of total spending on R&D in the Western world. In 1960, we funded one-third of all R&D in the Western world, but today we fund only one-sixth. In some high-technology sectors like electronics, the diminution in the defense fraction is even more dramatic. The lesson is clear: if we are to continue applying modern technology to critical defense missions, we must focus on funding research in basic and applied science, exploratory development, and advanced development (feasibility). This focus on the S&T Program is critical; it is our investment in the future.

DOD S&T investment has declined sharply in the past 25 years, even as the overall defense TOA has risen. Private industry has not been able to make up the difference. The result has been a serious erosion in US technological leadership in the international community. Figure 5-1 on page 5-8 shows the percentage of S&T funds (less SDI funding) relative to TOA from FY 1962 through FY 1997. Figure 5-2 shows the amount of S&T funds in constant FY 1991 dollars for the same period. S&T spending peaked in FY 1964, then declined at an average annual rate of 3.2 percent through FY 1980. Since FY 1980, spending has been increasing at an average annual rate of 3.5 percent. In an effort to look to the future, and despite a 2-percent average annual TOA decline, we have limited cuts in S&T spending in the Defense Program to only 1.4 percent annually. Currently, efforts are being made to develop DOD critical technologies through FY 1997 against system objectives projected through FY 2007. Working closely with industry on this plan, we are considering two strong recommendations from a recent industry report: first, that a new program element, funded at between \$200 and \$300 million, be established to accelerate research and fill gaps in the development of these critical technologies; and second, that integrated technology demonstrations be undertaken to provide "applications pull." The report further recommended that we consider a system requirement process to force the acceleration of technological progress as well as a system implementation in which a new technology can be integrated with other technologies to improve on existing or create new functional capabilities.

Force Generation Potential

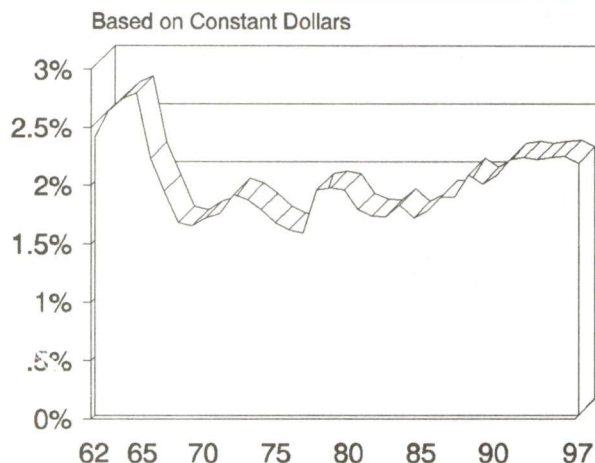


Figure 5-1. S&T Trend
(S&T [less SDI] as a percent of DOD TOA)

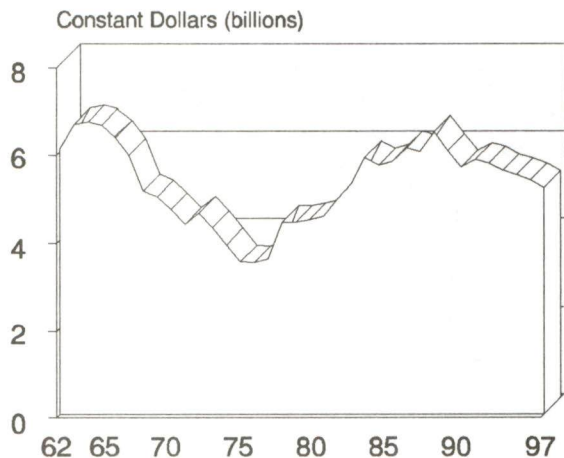


Figure 5-2. S&T Trend
(S&T [less SDI] in constant dollars)

MILITARY MANPOWER AND CRITICAL SKILLS

Military manpower availability will be a limiting factor only in the case of a global war or prolonged regional conflict. There are four levels of mobilization: selective, partial, full, and total. Personnel mobilization, regardless of the level, is limited by the number of reception and training centers. The President has the authority to activate up to 200,000 SELRES personnel involuntarily for 90 days (plus an additional 90 days if required) without declaring a national emergency. Figure 5-3 depicts the trends for US military manpower (active, Reserve, and retirees).

Figure 5-4 on page 5-10 shows the number of qualified 18- through 24-year-old individuals available for military service. The numbers decrease through 1997, but gradually begin increasing through 1999. Critical skill shortages in the AC include

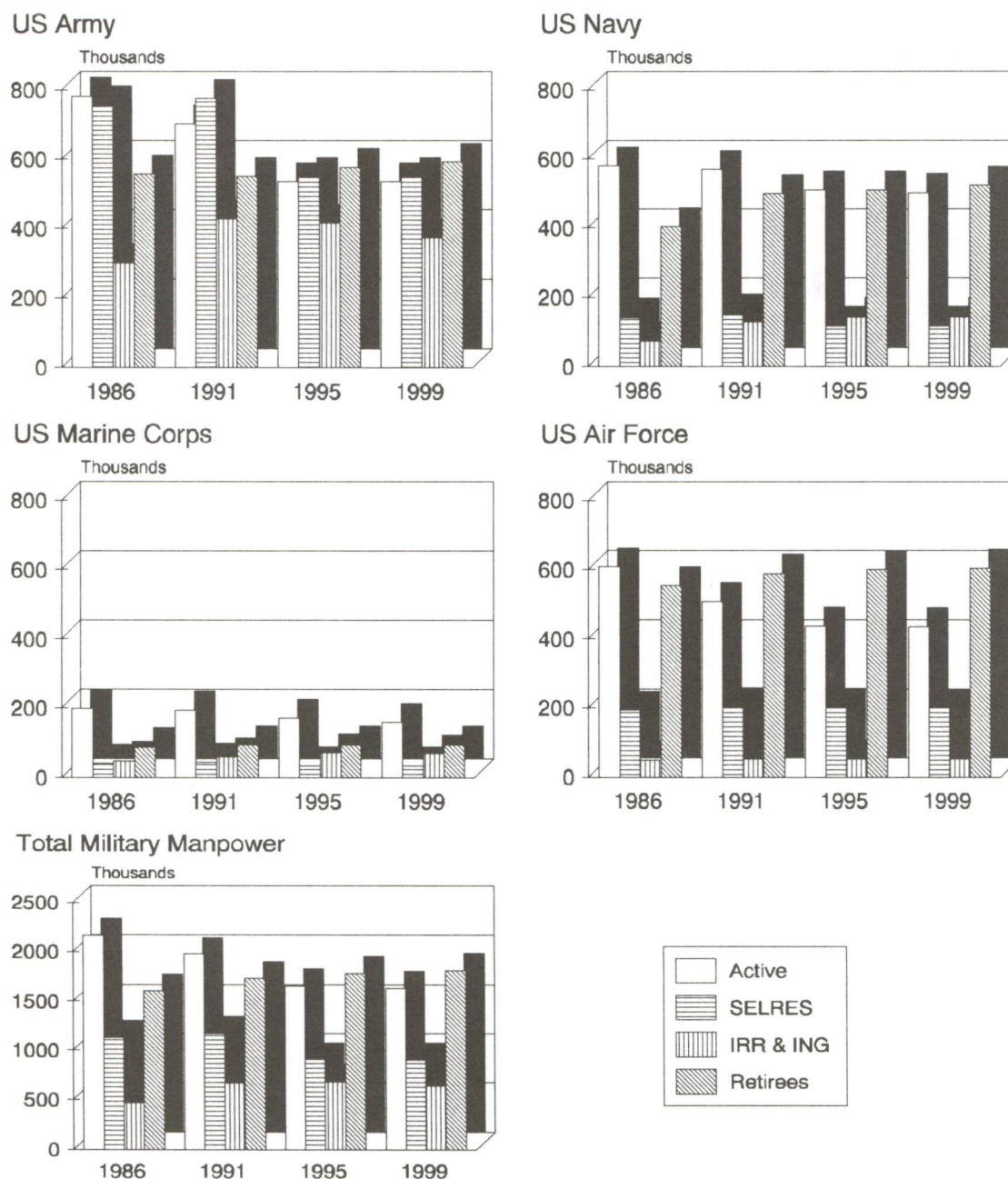


Figure 5-3. US Military Manpower Trend

combat arms, aircrew, medical, electronic technicians, linguists, engineers, and intelligence. Shortages in the RC include technical career fields requiring extended training.

EMERGENCY AUTHORITIES

Mobilization planning must provide a range of options for implementation before as well as after a declaration of war or national emergency. Planning also must ensure that legal authority will exist for all options. Table 5-5 on page 5-10 describes some of the

Force Generation Potential

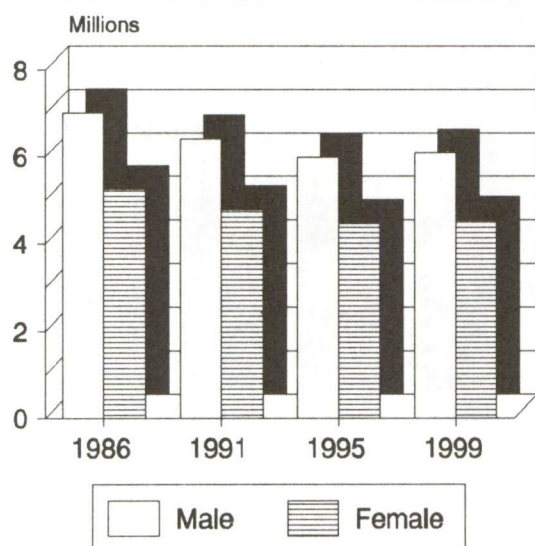


Figure 5-4. Personnel Qualified for Military Service (18 to 24 years of age)

Table 5-5. Emergency Authorities

Description	Authority	Description	Authority
MPS	Geographic CINC SECDEF	Charter	SECNAV
CRAF I CRAF II CRAF III	CINCMAC SECDEF SECDEF	Merchant Marine Act	SECTrans
FSS	SECNAV	Stop-loss	President
APF	Geographic CINC SECDEF	200,000 SELRES Callup	President
RRF	SECNAV MARAD	Retired Recall	Service Secretary
SRP	SECDEF SECTrans	Ready Reserve Callup	President

more important manpower-related emergency authorities. Emergency authority is derived from US Code and Public Law or from Executive Orders, Federal regulations, departmental regulations, and interagency agreements. Assuming the reenactment of the recently expired Defense Production Act, current emergency authorities give decision-makers legally sufficient options. Although some areas, such as contingency contracting, are in need of updating and improvement, emergency authorities are generally adequate to meet requirements. It should be noted that, if a contingency exceeds the 180-day statutory limit for SELRES, this mobilization authority is insufficient. Current experiences in Operations DESERT SHIELD and DESERT STORM have validated this point.

CONCLUSIONS

The US industrial base is undergoing systemic change. By end-FY 1997 it is estimated that it will take 2 to 4 years to restore production capability to FY 1990 levels for items whose lines have gone "cold" — for both the United States and the Soviet Union. This fact is a result of a combination of circumstances, including outdated facilities, fewer prime contractors and subtier suppliers, increased foreign sourcing, and increasing manufacturing equipment lead times. The United States continues to lead the world in technology development, but timely introduction of innovative technology into production is becoming more deficient. Because of these assumptions and the prospect for expanded warning time, any change in Soviet strategic direction can successfully be met with the implementation of major diplomatic efforts and timely and appropriate graduated mobilization responses.

Force Generation Potential

Chapter 6. Strategic Forces

GENERAL

The redundancy and mutual support provided by the Triad ensures that our strategic forces are a credible deterrent. However, as older systems are retired and START agreements are enacted, our residual systems must be modernized to retain deterrence into the next century. Further, while the probability of an East-West strategic crisis is quite low, there is growing concern for the proliferation of nuclear weapons among other nations.

Deterrence is achieved by convincing potential adversaries that the cost of aggression would exceed any possible gain. The United States therefore maintains a diverse mix of survivable and capable strategic nuclear offensive forces to hold at risk those assets most valued by Soviet leadership and provide a range of retaliatory attack options.

US strategic offensive forces are adequate to deter the Soviet use of nuclear weapons across the full range of potential nuclear exchanges. However, US strategic defensive forces are limited and will remain lacking in defense against ballistic missiles, cruise missiles, and, to a lesser degree, penetrating bombers. Both nations are working to reduce strategic forces to treaty-compliant levels while maintaining a viable nuclear deterrent. Additionally, there is concern for the increasing Third World ballistic missile threat.

The Triad provides a flexible, survivable, dispersed, and responsive force that is fundamental to our deterrence strategy. ICBMs are reliable and can respond immediately; SLBMs are survivable and dispersed; and strategic bombers are flexible.

STRATEGIC FORCES: US OFFENSIVE VS. SOVIET DEFENSIVE

Force Balance

The United States and the Soviet Union have maintained relatively comparable strategic nuclear forces. Figure 6-1 on the following page displays a rough order of magnitude comparison of US strategic offensive forces and Soviet strategic defensive forces. To counter our offensive capabilities and limit damage to their homeland, the Soviets have developed an extensive active and passive strategic defensive system; the United States faces a robust Soviet defense. The expected improvements in the Soviet SAM

Strategic Forces

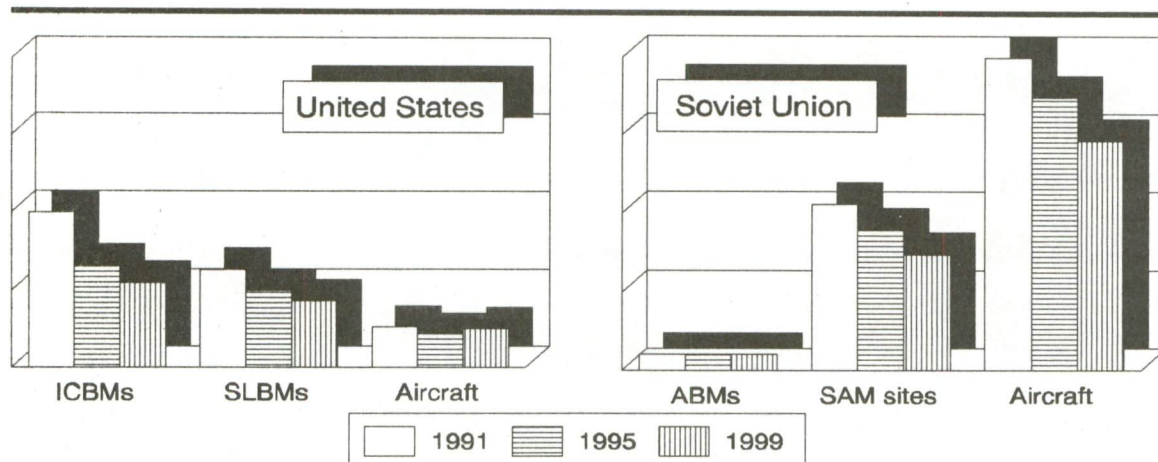


Figure 6-1. US Offensive vs. Soviet Defensive Forces

network complicate US strategic planning and reinforce the need for stand-off weapons and capable penetrating platforms.

Investment Trends

United States. With the PEACEKEEPER deployment and the MINUTEMAN upgrading, the United States completed a modernization phase aimed at improving reliability and increasing capability. Mobility upgrading would enhance system survivability, however, the Defense Program provides for R&D only, with no deployment of mobile-based systems.

As the SSBN force is reduced over the Defense Program period, modernization programs become crucial to the force. Modernization programs such as enhancements to the B-1B and the stealth technology of the B-2 will allow bomber missions to be completed without the need for defense suppression.

The Triad is complemented by C³ assets and aerial tankers. By the late 1990s, investment decisions will affect both of these areas.

Soviet Union. The Soviets continue to modernize and improve their active and passive defensive capabilities. The Soviets have spent vast sums on strategic defenses during the past decade. They have developed large, phased-array radars that can detect and track large numbers of targets and which have the potential to support missile defenses. They are developing the capability for long-range defense with AWACS aircraft and interceptors. These efforts will increase the difficulty of penetration for both aircraft and cruise missiles. Failure to continue US strategic bomber modernization could render the air-breathing leg of the Triad as only marginally effective.

The Soviets have continued to build deep underground bunkers and harden their missile silos. They are developing more mobile, survivable ICBM and C³ assets and are

deploying fourth-generation interceptors with look down-shoot down capabilities. Additionally, they are expected to continue their long-term commitment to R&D in strategic defense systems and space defense weaponry.

Conclusions

US offensive forces provide sufficient capability for deterrence. As nuclear forces are reduced and Soviet strategic defenses improve, US force modernization will be necessary to preclude an unfavorable shift in the strategic balance.

STRATEGIC FORCES: US DEFENSIVE VS. SOVIET OFFENSIVE

Force Balance

The United States and the Soviet Union have invested in strategic defensive forces, but significant differences exist in the approach and in the degree of commitment to the goal of effective strategic defense. Figure 6-2 displays a rough order of magnitude comparison of US strategic defensive forces and Soviet strategic offensive forces.

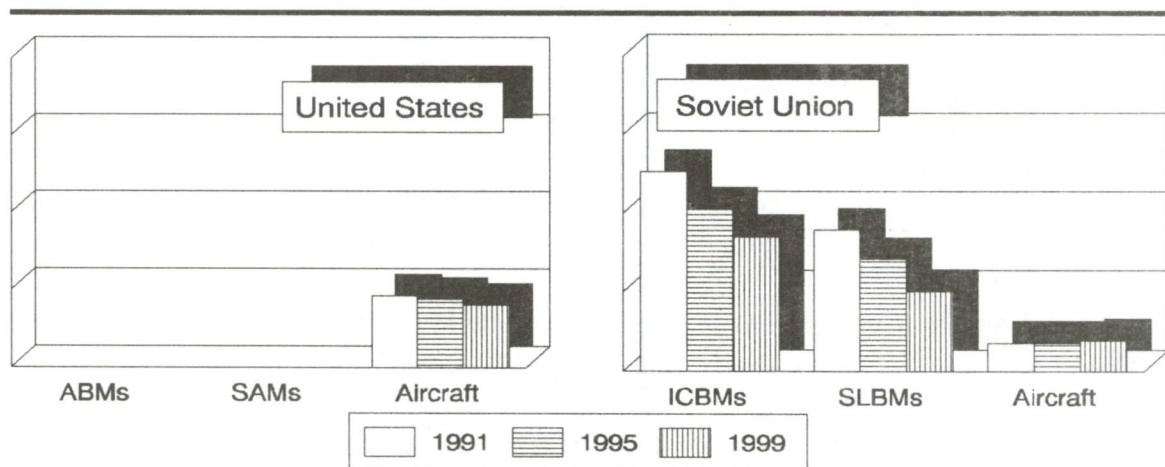


Figure 6-2. US Defensive vs. Soviet Offensive Forces

US strategic defensive forces consist of surveillance radars, AWACS, air interceptors, integrated C³ systems, and space-related assets. Additionally, the Defense Program funds SDI R&D activities in support of developing a system to provide global protection against limited missile attacks — whatever their source.

Investment Trends

United States. The US strategic defense capability is limited when compared to Soviet offensive capability. For the mid-term, the United States has an effective TW&AA capability against strategic bombers, but only a limited capability against ALCMs and

Strategic Forces

SLCMs. We will not be able to develop a defense against future low-observable cruise missiles and bombers by upgrading current systems. This will require radically improved technologies for surveillance, interception of missiles, ASW, and battle management. The ADI research program is exploring some of the most promising technical approaches. A decision to proceed beyond the ADI to full-scale development of a complete active air defense would be linked to future decisions on ballistic missile defenses. Regardless of future strategic defense decisions, it will be essential to maintain adequate warning capabilities as cruise missiles become more difficult to detect. Therefore, the ADI places its highest priority on technologies for surveillance of low-observable targets. Even though arms control agreements may reduce the number of Soviet strategic ballistic missiles, the United States must be able to respond to the continued development of a sophisticated air-breathing threat.

US ASW would reduce the Soviet SLBM capability. The Soviets are able to detect and engage enemy submarines in waters adjacent to the Soviet Union. However, they will remain incapable of threatening US SSBNs and SSNs in the open ocean.

While US sensors can detect and track inbound ICBMs, we do not possess a ballistic missile defense capability. The Joint Chiefs of Staff and USCINCSpace have developed requirements for Phase I of a Strategic Defense System that addresses this deficiency. The growing threat of nuclear, chemical, and biological capabilities in the hands of unstable regimes adds to the level of concern over our reliance on deterrence through the threat of retaliation. The President has directed that options be prepared for a defensive deployment that would provide a capability to defend targets worldwide against limited ballistic missile attacks.

Soviet Union. The Soviets are conducting a comprehensive modernization program and, although they are structuring this program in anticipation of reductions under a START accord, it will result in a force that is more accurate, survivable, and reliable. The pace of this modernization program is not as rapid as previous programs in the 1970s and early 1980s, but it remains significant, despite severe economic problems.

CONCLUSIONS

US strategy and forces are currently adequate to deter the Soviet Union from using strategic nuclear weapons. US strategic defensive forces have only a marginal capability; mostly, they contribute to early warning of a strategic attack. Reductions in Soviet strategic ballistic missiles through arms control agreements and continued Soviet modernization could result in a greater air-breathing threat. An operational strategic defense program, augmented by an improved air defense capability, would protect targets against limited strikes and present any aggressor with increased uncertainty regarding the effectiveness of an attack against the United States.

Chapter 7.

Nonstrategic Nuclear Forces

GENERAL

NSNF consist of ground-, sea-, and air-launched nuclear-capable weapons with delivery ranges of less than 5,500 km. Ballistic missile subcategories of NSNF include INF missiles, with delivery ranges between 500 and 5,500 km; and SNF missiles, with delivery ranges less than 500 km. All US and Soviet INF missiles are being eliminated under the terms of the INF Treaty.

FORCE BALANCE

Soviet Trends

Despite the ongoing implementation of the INF Treaty and the general reductions occurring in conventional force structure, the Soviet Union is maintaining substantial NSNF. However, unilateral withdrawal of NSNF units and nuclear warheads from former Warsaw Pact territory to the Soviet homeland has been initiated in response to the political changes in Europe. Depending on the extent of these withdrawals and other changes in their forces, Soviet land-based NSNF capability in eastern Europe is likely to consist principally of SNF missiles and DCA. The Soviet Union continues to modernize. They continue to build new SSMs, fourth-generation DCA, and improved ASMs. The Soviet Union also deploys nuclear torpedoes, antiship missiles, and depth bombs; large numbers of modern versions of each of these systems are deployed throughout the Soviet Navy. Despite the foregoing, the overall Soviet stockpile could decrease as a result of unilateral withdrawals or SNF agreements.

US Trends

The United States and NATO are committed to maintaining a viable nuclear deterrent in Europe. As was noted in the NATO London Summit Declaration, "... the Alliance must maintain for the foreseeable future an appropriate mix of nuclear and conventional

Nonstrategic nuclear forces provide a link between conventional forces and strategic nuclear forces. These forces have both deterrent and warfighting value and create uncertainty for any nation that would aggressively challenge our interests or those of our allies. In addition to their contributions to NATO and the European theater, these systems could assume a broader role globally in response to the proliferation of nuclear capability among Third World nations.

Nonstrategic Nuclear Forces

forces based in Europe, and kept up-to-date where necessary." The reduced Soviet threat to Europe will allow the retirement of certain systems and the withdrawal of selected other systems.

Third World Trends

Several Third World nations are demonstrating the technological capability and the political will to develop a nuclear weapons capability concurrent with TBM development. In the near term, these developments are not a significant threat to the US homeland, but there is a threat to our forward-deployed forces and those of our allies. By the end of this century, however, TBMs with greater range and accuracy are likely to be deployed, and the number of countries with a nuclear capability could grow. The risk of a Third World country using these weapons against US forces could be significant.

CONCLUSIONS

NSNF systems will continue to play a significant role in the US deterrence posture. The threat and risk of nuclear proliferation are extremely disturbing and argue for continued R&D for protection against limited strikes and accidental launches. Meanwhile, changes in Europe have permitted a significant reduction in NSNF warheads. Maintaining the deterrent value and credibility of these systems will require continued modernization. Although the NSNF structure is changing, it remains an essential part of our military capability.

Chapter 8. Space Forces

GENERAL

The United States categorizes military space activities into the main functional areas of force application, space support, force enhancement, and space control. Force application relates to research, development, and planning to be prepared to acquire and deploy space systems. Space support consists of both a satellite control capability and access to space through launching of mission payloads. Force enhancement consists of those space-related support operations conducted to improve the effectiveness of terrestrial and space-based forces. Space control consists of the capability to ensure access to space and deny the same to an adversary. In accomplishing these functions, the United States relies on a complex space force structure that includes technologically advanced satellites and launch vehicles. The capability to use military and civilian satellite systems and assured access to space for both is extremely important to our continued viability as a military and economic power.

The use of space systems in support of military operations is increasing worldwide. The United States and the Soviet Union will continue to place increasing reliance on space-based systems in the future. Additionally, a number of other countries are joining the pursuit of programs capable of executing military space functions.

The Soviet Union, our principal competitor in space, pursues these same functions but has a greater launch capability. Additionally, a number of other countries are joining the United States and the Soviet Union in pursuit of programs capable of executing military space functions.

FORCE BALANCE

The Soviet Union possesses the world's largest and most responsive space infrastructure. The Soviets will probably continue to improve their military space systems, but their overall space funding undoubtedly will be affected by restructuring in the Soviet economy. Soviet military space objectives have not changed and will continue to require an effective capability to provide space-based support to Soviet terrestrial forces. Soviet strategists, along with their US counterparts, believe that space is becoming increasingly significant for military purposes.

Space Forces

US space systems are generally more sophisticated technologically and longer-lived than Soviet systems, but the Soviets are steadily improving their systems' capabilities and satellite longevity. Historically, the Soviets have relied on space systems that are less advanced technologically with shorter lifetimes than contemporary US systems; these systems require a support system capable of frequent launches. However, despite a decrease from an average of over 90 space launches per year from 1980 to 1988 to only 74 launches in 1989, the Soviets have steadily increased the number of operational satellites they maintain in orbit to over 160. This reduced level of activity is due primarily to greater satellite longevity. Improvements, maintenance, or refurbishment to the extensive ground infrastructure that supports Soviet satellite systems indicates Soviet military space systems will continue to improve in the future. Figures 8-1 and 8-2 show a historical comparison of US and Soviet operational satellites and space launches.



Figure 8-1. Soviet and US Operational Satellites in Orbit

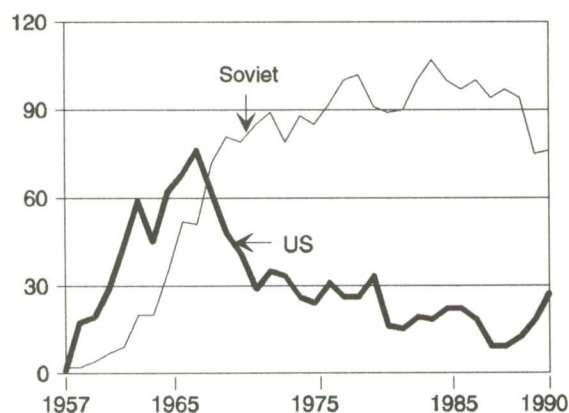


Figure 8-2. Soviet and US Space Launches

The Soviets maintain a significant ASAT capability against low-earth-orbit and medium-earth-orbit satellites. The Soviet Union also possesses inherent ASAT capabilities: exoatmospheric ABM missiles located around Moscow and at Sary Shagan test range; a ground-based laser at Sary Shagan that may be able to damage satellites in near-

earth-orbit; and EW assets that could be used against satellites at all altitudes. In contrast, the US ASAT program, which is still under development, will enable us to prevent any potential adversary from using space to threaten our forces in the future.

Beyond US and Soviet space activities, a proliferation of space programs, including launch vehicle and satellite development, is expected in numerous other countries throughout the world. Table 8-1 lists other nations that possess a satellite capability.

Table 8-1. Other Nations with Satellite Capability

Argentina	France	Italy	Pakistan
Australia	Germany	Japan	Saudi Arabia
Brazil	India	Luxembourg	Spain
Canada	Indonesia	Mexico	Sweden
China	Iraq	Netherlands	United Kingdom
Czechoslovakia	Israel		

INVESTMENT TRENDS

US capabilities may keep pace with expanding requirements in the 1990s, with some enhancements provided by implementation of programs contained in the Defense Program. However, R&D for space systems continues to suffer limited funding that ultimately will affect the quality and flexibility of future deployment options. The emerging multipolar threat will require US space forces to be increasingly responsive and flexible. To support warfighting needs completely, space systems must have the capability to operate effectively in the following functional areas.

Force Application

The United States does not possess a ballistic missile defense capability, but SDI research is now focused on global protection against limited ballistic missile strikes. Such protection would include limited numbers of space-based interceptors. This subject is addressed in Chapter 6.

Space Support

US satellite control assets continue to be developed and modernized to fulfill increasing satellite support requirements. However, launch support for the larger-class missions (TITAN IV) continues to be burdened by an aging space launch infrastructure and excessive launch pad-processing time. TITAN IV vehicles can spend up to 6 months on the pad prior to launch. The present launch facility capabilities put at risk even our peacetime national security needs.

Space Forces

A requirement exists for a tactically responsive space force structure to support a variety of small mission payloads that can provide direct support to the unified and specified commands on demand. A recent example of the utility of these systems is found in the Marine Corps' employment of the Defense Advanced Research Projects Agency prototype MACSAT, a small, single-mission satellite providing direct administrative and logistic communications during Operations DESERT SHIELD and DESERT STORM.

Force Enhancement

Responding to worldwide contingencies requires precise, all-weather navigation accuracy. The NAVSTAR GPS provides critical position data essential to our forces. The current Middle East operation has reinforced the need for navigation gear. In FY 1993, GPS, which currently offers near constant two- and three-dimensional global coverage, will provide continuous two- and three-dimensional global coverage. GPS also provides the ability to selectively deny direct full-system accuracy to unauthorized users through encryption. Military receivers obtain greater accuracy than commercial receivers which obtain from 30- to 100-meter accuracy. The lack of dominant terrain features in the desert prompted widespread use of commercial receivers by military forces during Operation DESERT SHIELD.

MILSATCOMs provide an essential component in the overall US strategic and tactical C³ architecture. Existing systems are being upgraded and modified to increase their reliability and capacity. The new EHF MILSTAR satellite system will provide jam-resistant strategic and tactical communications for US forces engaged in crisis operations. With cross links between satellites, MILSTAR will not require multiple hops to ground nodes to link around the globe. MILSTAR remains our highest priority C³ system.

The requirement for continuous, global, real-time surveillance information has become even more critical with planned reductions in US forward presence. The SBWAS system is designed to meet the requirements for global surveillance.

Space Control

The existing Soviet co-orbital ASAT system constitutes a risk to the United States and its allies. Additionally, the introduction of military-capable satellites by potential adversaries may constrain US tactical forces from effectively executing US foreign policy or military operations. The capability to defend satellites and deny our adversaries access to space is still required.

CONCLUSIONS

With the exception of kinetic-energy ASAT and SBWAS, US military space systems are reasonably well-resourced to meet the requirements of the coming decade. With the

planned reductions in US forward presence, the requirement to continue joint concept exploration of SBWAS is essential. Budget limitations and consequent reduction in ASAT program funding will delay its operational fielding. MILSTAR is essential as it provides the backbone of the US communications architecture for the late 1990s and beyond. Our launch infrastructure requires modernization to streamline the launch process and improve response time. Events in the Middle East such as the 1987 mine clearing operation in the Persian Gulf and Operation DESERT STORM are clear indications of the importance placed on NAVSTAR GPS. In view of the extensive Soviet space capabilities and the need to support a tactical reaction to regional contingencies like Operations JUST CAUSE and DESERT STORM, space forces remain critical to our national interest.

Space Forces

Chapter 9.

Conventional Contingency Response

GENERAL

Figure 9-1 displays potential areas of crises and threats to US interests. To examine the capabilities of our forces to respond to those crises and threats, a number of scenarios were devised. These scenarios were described in general terms in Chapter 1; additional details are provided in Table 9-1 on the following page. The scenarios provide key variables for capability analysis, including infrastructure details, distance to the operational area, warning, forces available on D-Day, strategic lift, and sustainment parameters. Static and dynamic analyses using FY 1995 fielded forces were combined with military judgment to complete quantitative and qualitative analyses of the forces' capabilities to accomplish the wartime functions of mobilization, deployment, employment, and sustainment.

The capability to mobilize, deploy, employ, and sustain conventional forces was analyzed in the context of a counterinsurgency, a lesser regional contingency, two individual cases of a major regional contingency, concurrent or sequential regional contingencies, and a crisis in Europe leading to a war between NATO and the Soviet Union.

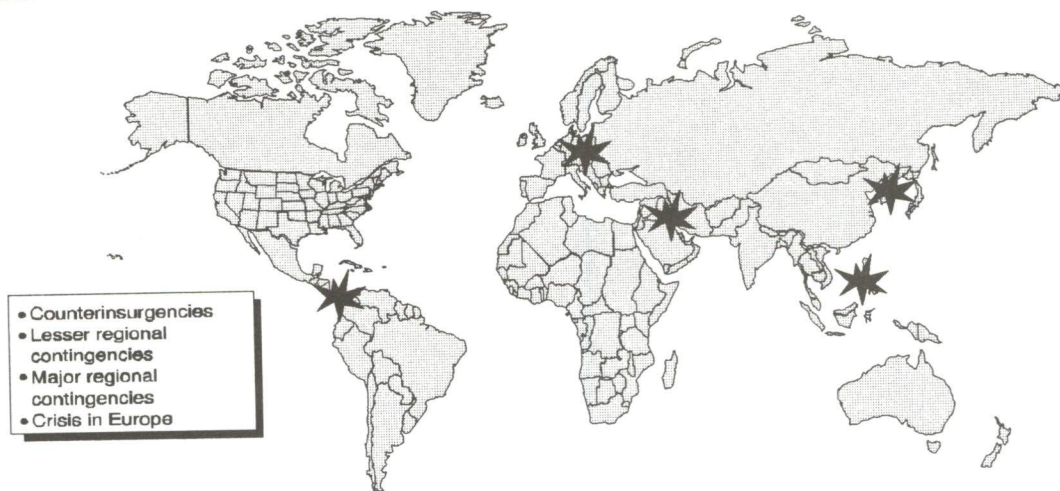


Figure 9-1. Potential Areas of Crises

Conventional Contingency Response

Table 9-1. Conventional Conflict Scenarios

	Counter-insurgency/ Counter-narcotics	Lesser Regional Contingency	Major Regional Contingency: Korea	Major Regional Contingency: SWA	War Escalating from a European Crisis
Infrastructure	None	Very Limited	Good	Fair	Good
Threat	Light	Light	Heavy	Heavy	Heavy
Distance	2,000-6,000 nm	2,000-6,000 nm	6,000 nm	7,000 nm (air) 8,000 nm (sea)	4,500 nm
Warning	days	days	days	days	days
Mobilization	None	None	200,000	200,000	Full
Airlift	Active Fleet	Active Fleet	Active Fleet ARF Fleet CRAF II/ROK	Active Fleet ARF Fleet CRAF II	Active Fleet ARF Fleet CRAF III NAPCAP
Sealift	FSS/MSD	FSS/Limited RRF/MSD	FSS/RRF/SRP MSD/ROK	FSS/RRF SRP/MSD	FSS/RRF MSD/US EUSC/NDRF NATO
Pre-positioning	MPS	Limited Afloat MPS	Limited Afloat MPS	Afloat/MPS Limited Ashore	NALMEB POMCUS PPP/MPS Limited Afloat
Days of Combat (Intensity)	450 days	90 days (low to mid)	120 days (mid to high)	120 days (mid to high)	> 50 days (mid to high)

A number of assumptions were made in these analyses:

- ☐ Sufficient infrastructure exists at contingency locations to accept and support deploying forces unless otherwise stated.
- ☐ Pre-positioned stocks are maintained at current levels.
- ☐ Strategic lift is not attrited.
- ☐ Sealift uses the most direct routing.
- ☐ The MRC-E scenario, placed in SWA, assumes that Iraq has reconstituted its forces and subsequently attacks in the mid-1990s through Kuwait to secure coastal LOCs and oilfields in Saudi Arabia.

It is important to note that the MRC-E scenario was developed before the current crisis in SWA, thus many scenario details differ from the situation currently unfolding in the region. In this scenario, Iraq is merely a proxy for a generalized class of threats that may arise within the context of a major regional contingency. It also is important to note that future requirements vis-a-vis this type of threat will be influenced to a great degree by the outcome of the current crisis.

FORCES

Conventional contingency response forces in the Defense Program are marked by several modernization efforts, but system inventories and personnel numbers will decrease between FY 1991 and FY 1999. AC and RC end strengths will be reduced by approximately 17 and 26 percent respectively.

CAPABILITIES

The forces and capabilities provided by the Defense Program are limited by shortfalls in mobilization, deployment, and sustainment. Specific discussions of these areas follow.

Mobilization

Reserve forces are required in all contingencies. In a counterinsurgency and lesser regional contingency, the principal requirement is for additional strategic airlift aircrews. Only part of this shortfall would be met on a voluntary basis; thus in these two scenarios, where mobilization is not postulated, potentially there would be personnel shortages. With the exceptions of sequential or concurrent regional contingencies, a crisis in Europe leading to a war between NATO and the Soviet Union, or a global war, all other scenarios examined can be met within the limits of the Presidential 200,000 SELRES callup authorized by the scenarios. This sufficiency would not apply if deployments lasted longer than the scenarios postulate, extending past the statutory 180-day limit.

Although forces mobilized generally are sufficient, their deployment by the required delivery dates is not assured. Our assessment concludes that Army RC roundout brigades are not responsive to no-notice or short-notice contingencies. Further, throughout the period of this assessment, reductions in Reserve force structure will occur as indicated in Chapter 5, Figure 5-3. A more detailed discussion of AC and RC forces, their missions, and their appropriate mix follows in Chapter 11. Force regeneration and reconstitution potential, including mobilization of the industrial base, was discussed in Chapter 5.

Deployment

Trends in airlift capability are shown in Figure 9-2 on page 9-4. Total airlift capacity in MTM/D is approximately the same from FY 1991 through FY 1995. Airlift capacity increases by 14 percent from FY 1995 through FY 1999 as more-capable C-17s replace a portion of the C-141 fleet, then decreases as the C-141s reach the end of their service life and retire past the turn of the century. Trends in dry-cargo sealift capacity are shown in Figure 9-3, also on page 9-4. Total dry-cargo capacity decreases by 31 percent between FY 1991 and FY 1999 because the total number of dry-cargo ships in the US-flag merchant fleet will decline from 246 in FY 1991 to 126 in FY 1999; the EUSC fleet will decline from 35 in FY 1991 to 18 in FY 1999. The number of MSC ships remains

Conventional Contingency Response

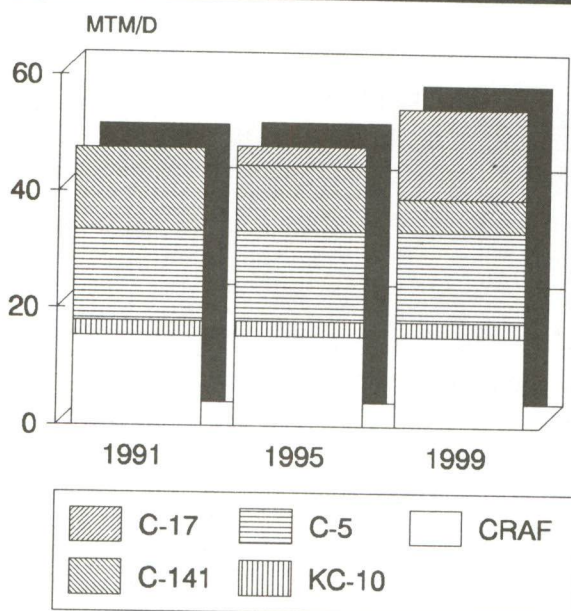


Figure 9-2. Airlift Capability

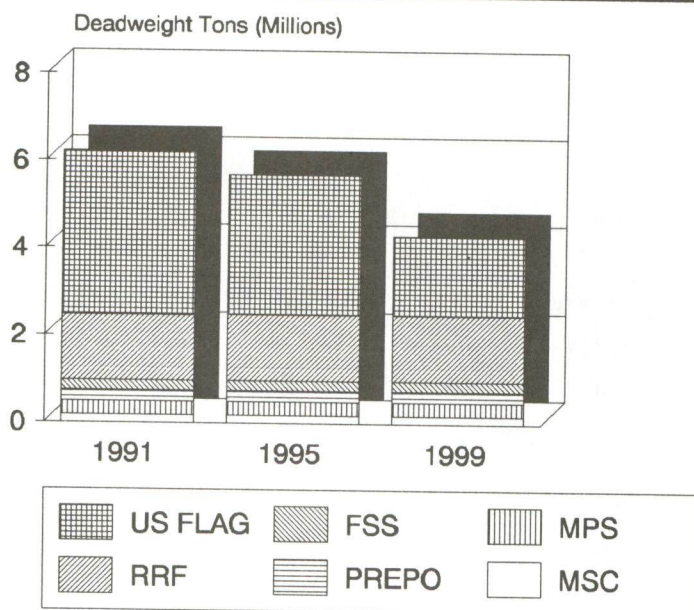


Figure 9-3. Sealift Capacity

constant at 40 during this period. The number of RRF dry-cargo ships is projected to increase from 83 in FY 1991 to 104 in FY 1999.

Equipment and supplies pre-positioned afloat and ashore complement strategic lift, help eliminate shortfalls, and improve crisis response time. Current major pre-positioned equipment sets and their locations are summarized in Table 9-2. These locations are based largely on former projections for a global war centered in Europe. The future environment dictates the need for a redistribution of, and possible additions to, pre-positioned equipment.

Table 9-2. Pre-positioned Equipment and Supplies (1990)

Command	Army	Air Force	Navy	Marine Corps
Global ¹	4 PREPO Ships (Diego Garcia)	3 PREPO Ships (1 Mediterranean and 2 Diego Garcia)	1 PREPO Ship (Diego Garcia)	3 MPS Squadrons (listed below)
USEUCOM	POMCUS Sets ² (Germany, Netherlands, Belgium) ARPS (Italy) ³	NATO Pre-positioning Procurement Package		MEB Equipment in Norway and MPS (4 ships) in Eastern Atlantic
USCENTCOM ⁴	Equipment at sites in countries under various programs (e.g., HNS and WRS)	Equipment at sites in countries under various programs (e.g., HNS and WRS)		MPS (5 ships) in Indian Ocean
USPACOM	Equipment at sites in countries under various programs (e.g., HNS and WRS)	Equipment at sites in countries under various programs (e.g., HNS and WRS)		III MEF MPS (4 ships) in Western Pacific
USSOUTHCOM	The majority of USSOUTHCOM's theater WRS is positioned in CONUS.			

¹ 4 DLA (POL) PREPO ships at Diego Garcia are not included as they support all Services. First priority of PREPO ships is to support global war.

² 6 partial division sets and 1 M-Day shortfall package (NATO is currently readdressing the requirement).

³ Heavy brigade set.

⁴ Second priority for PREPO ships is USCENTCOM.

The United States has the capability to deploy the required forces in all scenarios except as follows: in the early weeks of a short-warning war in SWA or in two regional contingencies occurring sequentially or concurrently, shortages will exist in airlift, sea-lift, or pre-positioned equipment and supplies — or a combination thereof.

The MRC-E scenario assumes that all US forces, equipment, and supplies have been withdrawn from the region and that the MPS and APF are reconstituted as they were before Operation DESERT SHIELD. In addition, the scenario assumes that the United States does not have access to foreign lift and that passage through the Suez Canal is unimpeded.

Figures 9-4 through 9-6 on the following pages show the deployment of US forces over time compared with the requirements generated by the MRC-E scenario parameters. It should be noted that the scenario allows only CRAF Stage II and SRP mobility enhancements. With CRAF Stage II and the SRP activated, the greatest shortfall is in airlifted cargo. Personnel airlift is also insufficient. Cargo sealift (dry-cargo resupply and ammunition) is insufficient as well, although not to as significant a degree as is the airlift

Conventional Contingency Response

Cumulative Passengers

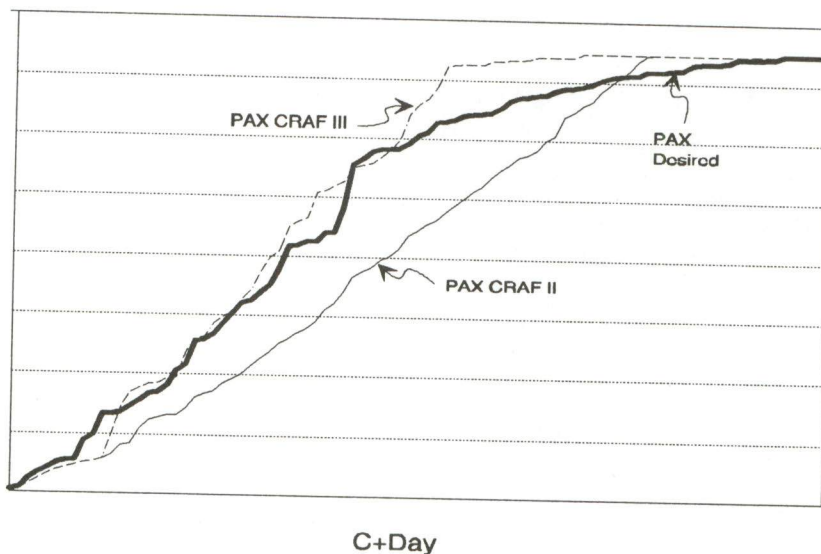


Figure 9-4. Passenger Airlift for MRC-E

Cumulative STONS

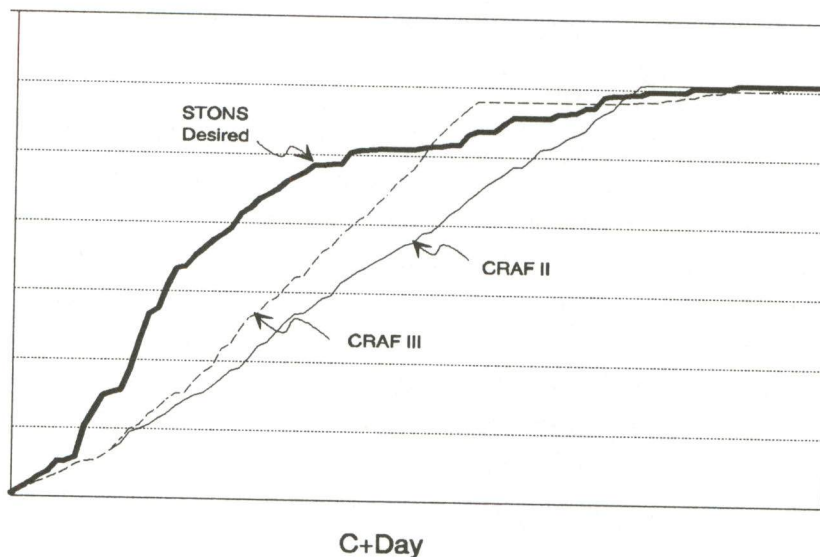


Figure 9-5. Cargo Airlift for MRC-E

component. The end result is that the forces, equipment, and materiel required by the scenario do not arrive completely in theater until C+49; this figure exceeds the deployment timelines specified in the scenario by one week.

Because of this deployment shortfall, an excursion from the baseline mobility case was examined. In this instance, using the same forces, equipment, and materiel required by the scenario, CRAF Stage III was activated and the US-flag fleet was activated by a full requisitioning of the US-flag merchant marine and EUSC shipping. The results of this greater number of mobility assets are also plotted in Figures 9-4 through 9-6.

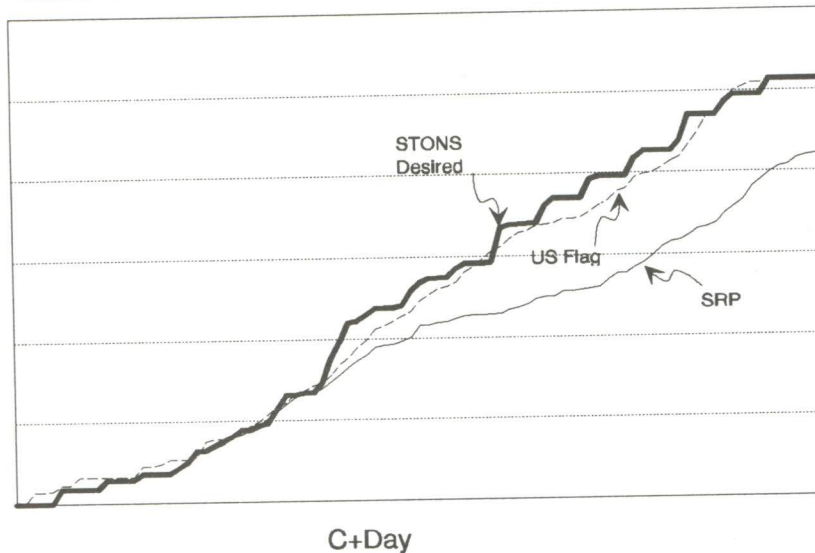
Cumulative STONS

Figure 9-6. Cargo Sealift for MRC-E

Despite these additional mobility assets, a deployment shortfall still exists between C+7 and C+45.

The main reason for this shortfall is short warning time, although the extensive distance to the theater obviously has a major impact. The impact of these deployment shortfalls on the employment of forces in this scenario is discussed below. Our mobility analysis of this scenario concludes that pre-positioned equipment ashore or afloat, additional strategic lift capacity, or a combination of both would alleviate much of the shortfall. However, additional lift capacity alone cannot overcome short warning time or the lack of enough pre-positioned equipment and supplies. Strategic mobility implications for this and other scenarios are under study in the congressionally mandated Mobility Requirements Study.

Employment

Postulated available forces are adequate to defeat potential threats in all scenarios with the exception of the MRC-E scenario or two regional contingencies occurring sequentially or concurrently because of deployment and sustainment deficiencies. Further, forces are potentially inadequate for a crisis in Europe leading to a war between NATO and the Soviet Union because of sustainment shortfalls. They are potentially inadequate in the long-warning global war scenario because of mobilization shortfalls in personnel, training, and the industrial base.

Major Regional Contingency-East. In the baseline case described in Table 9-1, Kuwaiti and Saudi Arabian forces are unable to slow the advance of Iraqi forces. Kuwait is defeated and the Iraqi advance into Saudi Arabia continues, although attrition of Iraqi

Conventional Contingency Response

forces is the focus of mainly US air power. Fixing actions by Iraqi lead units enable their follow-on units to proceed toward the ports where US forces come under attack. Allied air power inflicts significant damage to Iraqi forces, slowing but not stopping their advance.

Because of the deficiencies observed in the baseline case, a number of excursions to the baseline scenario were waged in an attempt to isolate the reasons for these deficiencies. Variations in the excursions included:

- ❑ Conventional or chemical operations.
- ❑ Differing Iraqi invasion axes.
- ❑ Afloat pre-positioning of equipment and supplies for additional US heavy divisions with organic CS and CSS assets.
- ❑ Two different warning times.

In the gamed excursions, some combinations of variables produced better results than others. The results demonstrated that significant US heavy forces must be in place early in the crisis, either through pre-positioning or earlier deployment. US heavy combined arms forces (including air forces) are necessary for success; the short timelines imply that some elements must be pre-positioned. Other strategic mobility implications for this scenario currently are under study in the congressionally mandated Mobility Requirements Study.

It should be noted that the forces and warning times used both in the baseline case and in the scenario excursions were considerably less than those actually enacted to date in Operations DESERT SHIELD and DESERT STORM. Additionally, the excursions examined only a finite number of alternatives. Further analysis could show that early deployment of a greater number of air assets might have achieved the same results as earlier deployment of heavy ground forces.

Major Regional Contingency-West. In one scenario analyzed, DPRK forces attack South Korea with little warning following a period of increased tensions. ROK and US forces stop DPRK forces north of Seoul. In another recent study analyzed, results were significantly different. Although DPRK readiness has suffered from cut-backs in air and ground training, the threat to US and ROK forward-deployed forces remains high. US tactical air assets would aid significantly in slowing any DPRK offensive.

Sustainment

Sustainment shortfalls exist in level-of-effort and threat-oriented munitions stocks, bulk POL storage and distribution, selected secondary end-item PWRS, medical services and supplies, aviation maintenance, and CBW defense equipment. Recent improvements in munitions sustainability, particularly in high-technology munitions, will be slowed and

in some cases reversed by FY 1997. LOTS operations may be required to conduct ship discharge operations of especially hazardous material. Medical personnel shortfalls, though not serious, are projected. At the same time, the medical equipment posture improves during the decade.

Counterinsurgency and Lesser Regional Contingencies. The presence of host-nation support or a US logistic infrastructure is key in rapid response contingencies. POL and their bulk distribution will be a concern where the infrastructure is limited. Preferred munitions sustainment could be a problem in opposing countries that have access to technologically advanced weapon systems.

Major Regional Contingency-East. Water purification and the inland distribution of water, POL, and general cargo are limiting factors.

Major Regional Contingency-West. Ammunition resupply will be needed early and will compete with lift assets carrying personnel and other critical materiel to the theater.

Escalation of a Crisis in Europe. Shortfalls exist in preferred munitions and secondary end-item PWRS. It would likely be 6 to 24 months before industrial base mobilization or surge production could begin to deliver critical items. Aviation maintenance shortfalls will limit warfighting capability. Bulk POL war reserve inventories make up only 60 percent of the wartime need. Much of the petroleum is transported by commercial carrier, and the NATO pipeline system cannot handle wartime requirements.

CONCLUSIONS

The capabilities of US military forces are limited in the postulated scenarios primarily by deployment and sustainment shortfalls in the most demanding cases, although training and readiness issues connected with mobilization also could be a negative factor. A short-warning war in SWA or two regional contingencies occurring sequentially or concurrently would produce the greatest shortcomings. Employment capabilities generally are sufficient, but shortfalls in the above-noted categories could have potentially grave consequences.

Today's environment dictates the need for more strategic lift assets, additional pre-positioned equipment and supplies, or a combination of both to alleviate deployment and sustainment shortfalls. A variety of options are being examined by the congressionally mandated Mobility Requirements Study.

Conventional Contingency Response

Chapter 10. Special Operations Forces

CAPABILITIES

US SOF, composed of forces from the Army, Navy, and Air Force, currently are prepared to perform operations across the full range of assigned special operations missions, and overall capability is expected to improve through FY 1997. However, full mission capability now and in the future is degraded by deficiencies in some specialized equipment and shortages of some qualified personnel, mainly linguists.

The US Marine Corps has no units with special operations as their primary mission; however, the Fleet Marine Forces are specially organized, trained, and equipped to conduct a broad spectrum of maritime special operations that complement the capabilities of dedicated SOF.

The mission and organization of Air Force and Navy RC SOF is such that they are responsive to contingency requirements and are quickly available to join with active units.

A large portion of SOF reside in the RC. This is especially true of the Army's SOF and, to a lesser extent, the Air Force. PSYOPS and CA capabilities of US SOF are almost exclusively in the Army RC (97 percent and 86 percent respectively) as are half of the Army's Special Forces. With such a large portion of the PSYOPS and CA units in the RC, there are recurring accessibility and training problems associated with employing these capabilities in support of contingency taskings. Furthermore, policy constraints make it impractical to activate ground RC SOF for extended peacetime missions.

Many allied nations have SOF that may complement US SOF; however, their focus and capabilities vary.

US special operations forces — which include civil affairs and psychological operations units — are highly trained, skilled, specialized units that primarily perform unconventional warfare, direct action, special reconnaissance, foreign internal defense, and counterterrorism. These specialized missions may be independent operations or in support of conventional forces. Special operations forces also perform collateral special operations missions such as humanitarian assistance, security assistance, counternarcotics, and personnel recovery operations. These forces also may participate in special activities consistent with Executive Order 12333.

Special Operations Forces

Potential adversaries in all regions of the world possess varying SOF capabilities. Soviet SPETSNAZ are highly capable, but unit readiness is degraded periodically because of a high conscript turnover rate. Iraqi SOF capabilities include commando and special forces brigades, as well as special amphibious teams.

TRENDS AND DEFICIENCIES

The decade-long effort to revitalize US special operations capabilities has been largely accomplished. These forces will remain relatively constant with some growth in the AC.

The ongoing expansion of US SOF will improve capabilities, but continued improvements are required in SOF-specific mobility and joint communications capabilities. In joint communications, SOF will continue to require instantaneous, secure, global communications. While the Defense Program partially relieves current needs, related manpower and maintenance issues are not adequately resourced.

The role of RC SOF in the future is uncertain. In the past, RC SOF have been essential in operations plans of the unified and specified commands, especially in global war scenarios. The planned availability of RC SOF for this wartime role has freed AC SOF to participate in peacetime engagements, rather than remaining solely focused in their global war primary areas of operations. The decreasing likelihood of global war and increased SOF emphasis on peacetime engagements have generated a needed review of the appropriate mix between AC and RC SOF.

CONCLUSIONS

In general, US SOF are skilled across the spectrum of conflict. Although deficiencies exist in long-range vertical extraction and communications, overall capability is expected to improve through FY 1997.

Chapter 11. Special Interest Areas

ALLIANCES

General

The United States will continue to meet its worldwide commitments through various bi-lateral and multilateral treaties and alliances. These commitments range from cultural and economic agreements to military and security alliances. A complete listing of treaties in force is available in the annually published Department of State document, "Treaties in Force: A List of Treaties and Other International Agreements of the United States."

A number of special interest areas critical to the overall capabilities of the US Armed Forces apply across the analyses already presented.

Major Alliances Involving Military Security Arrangements

Table 11-1 delineates alliance relationships.

Assessment

Although the chances of Superpower confrontation are greatly reduced, the expected rise in nationalistic and ethnic tensions will increase the potential for regional conflicts. Alliances provide stability, deter aggression, and support forward presence of US forces.

Table 11-1. Alliance Relationships

North Atlantic	Belgium	Germany	Luxembourg	Spain
Treaty	Canada	Greece	The Netherlands	Turkey
Organization	Denmark	Iceland	Norway	United Kingdom
	France	Italy	Portugal	United States

Changes in the European continent and the breakup of the Warsaw Pact result in a reexamination of strategic issues and requirements for Europe. The increasing integration of governments within the European Community and regional bodies such as CSCE may erode NATO's purview over many security issues. The development of a new NATO military strategy is ongoing. Despite these changes, NATO will continue to exist as a military alliance, but its focus will likely change from an external threat to mitigating internal discontinuities or facilitating cooperation in out-of-area crises. US membership and forces in Europe will provide stability through this period of change, but as new relationships develop, US influence will likely decline.

Special Interest Areas

Table 11-1. (cont'd)

Inter-American Treaty of Reciprocal Defense	Argentina Bolivia Brazil Chile Colombia Costa Rica	Cuba Dominican Republic El Salvador Guatemala Haiti	Honduras Mexico Nicaragua Panama Paraguay	Peru Uruguay United States Venezuela Trinidad-Tobago
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The original Rio Pact treaty, signed at Rio de Janeiro in 1947, remains in effect and provides for the peaceful settlement of disputes in the Western hemisphere and common action against aggressors external to the hemisphere. The treaty provides for hemispheric cooperation and assistance and should remain in effect for the future.

The Australia- New Zealand- United States Treaty of 1952	Australia	New Zealand	United States
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The United States suspended obligations with New Zealand under the treaty as a result of New Zealand choosing to ban nuclear-powered and nuclear-capable ships from its waters. Bilateral relations are being maintained between the United States and Australia and between Australia and New Zealand. Australia and the United States will remain solid allies. Relations between New Zealand and the United States depend on New Zealand's position on nuclear issues.

The 1954 Mutual Defense Treaty Between the United States and the Republic of Korea	Republic of Korea	United States
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The United States and South Korea maintain a close military and economic relationship. Because of improved ROK military capabilities and overall US force reductions, the United States has announced its intention to decrease the numbers of US forces stationed in South Korea. Initial draw-down of over 7,000 personnel has begun and will be completed by the end of 1992. The future of the alliance depends upon the continued separation of the two Koreas.

The 1960 Treaty of Mutual Cooperation and Security Between the United States and Japan	Japan	United States
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Japan and the United States maintain close ties in all areas, although economic relations will continue to be strained by trade frictions. This treaty is Japan's only defense treaty. Although Japan is the dominant economic power in the Pacific and is becoming stronger in the world, its military remains a defensive force because of constitutional restraints. Although there is an effort to expand this limited role, popular Japanese opinion and regional sentiment remain against such a move. Regardless, Japan continues to be a valuable ally in the region. The treaty should remain in effect and may form the basis for conflict resolution in the Pacific Basin.

Should conflict erupt, alliances are the primary basis for the host-nation support and infrastructure necessary for US power projection.

INTELLIGENCE, COUNTERINTELLIGENCE, AND WARNING

Intelligence

While the United States and its allies ostensibly “won” the Cold War, the intelligence efforts of both East and West continue in earnest. The Soviets’ extensive intelligence collection efforts, targeted primarily at the United States and its allies, resulted in extensive information on DOD and NATO capabilities, operations, and forces. The intelligence derived from this information improved Soviet military assessments, weapon development, arms control negotiating positions, and benefitted Soviet deception and denial operations.

Although differences in techniques and procedures exist, US, US-allied, and Soviet intelligence operations — as well as the intelligence operations of the East European countries, which in some instances still follow the Soviet model — effectively collect intelligence on a global basis, massing resources against specific targets or geographic areas. Soviet-style intelligence operations traditionally have been characterized by:

- ☐ A highly centralized structure.
- ☐ Considerable freedom of operation and permissive laws.
- ☐ Greater resources (particularly manpower).
- ☐ Skilled application of technologies and tradecraft.
- ☐ Greater use of agent intelligence.

Soviet and East European intelligence cooperation will diminish and eventually cease as the Warsaw Pact dissolves. Soviet military intelligence effectiveness will suffer from the loss of control and cooperation of the East European intelligence services and the relocation of intelligence resources to the Soviet Union.

Many Third World and non-aligned nations pose effective, regionally oriented, and frequently multidisciplined intelligence threats. Although these countries are often technologically inferior, their capabilities will improve as enhanced collection systems are developed or acquired. Of these nations, only China has a proven spaceborne collection capability. Cuban intelligence will remain highly proficient, even though reduced Soviet support may constrain operations.

Through human and signal intelligence operations, drug trafficking cartels have effectively acquired warning of US CN activities. The lack of adequate security measures and other operations security shortfalls will continue to be a weakness in CN operations.

Special Interest Areas

Counterintelligence

The post-Cold War environment for espionage is more favorable than at any time since the end of World War II. Former adversaries face difficult challenges because of burgeoning East-West relations and commercial ventures, intrusive arms controls inspections, loss of internal control and restrictions, defectors and emigres from the East, and “volunteer” spies from the West.

Soviet and Soviet-allied CI operations enjoyed considerable advantages over the West; recently, however, these advantages have lessened. In spite of recent reforms, East European CI continues to function. Reforms of Soviet CI are expected shortly. Soviet and East European CI services must now confront legal curbs, reduced resources, intelligence threats from neighboring countries (including former allies), greater foreign access to open-source information, internal strife, ethnic rivalries, and a less cooperative citizenry.

In contrast, US and US-allied CI operations will not experience such political turmoil. Little change in extant organizational structures and bilateral relationships is expected. Prospects for early detection of Soviet and East European espionage activities are diminished; however, these activities are much more likely to be aimed at economic rather than military targets. Thus, the United States probably will continue to experience espionage activities that can be damaging.

Warning

Overall US intelligence capabilities are assessed to be good to excellent in providing information on changes in the military capabilities of potential adversaries. Such military data, analyzed in the context of early political and economic indicators of an increased threat to the United States or its interests, provides the basis for warning time assumptions. Reliably determining an adversary's exact intent early enough to allow low-cost deterrent reactions remains a goal of the warning process.

The future of US warning capabilities will be dependent on a number of factors. Resource constraints and personnel reductions in the intelligence community will have a negative effect, but the reduction in the forward presence of US forces — inevitable as the global security environment changes — will impair our ability to gain intelligence on the capabilities of potential adversaries.

ACTIVE AND RESERVE COMPONENT MIX AND MISSIONS

General

The ending of the Cold War and the changing world environment, coupled with fiscal constraints and a new strategy, warrant a review of the Total Force Policy and a

restructuring of military forces. When the Soviet and Warsaw Pact capability for a short-warning European or global conflict was relatively high, large numbers of AC and RC forces were required to enable the United States to maintain a large forward presence in Europe and to provide follow-on reinforcements to NATO. However, the demise of the Warsaw Pact and the reduction of Soviet force levels diminish the requirement for large ready forces. The time required for the Soviet Union to change direction and rebuild its conventional forces to previously threatening levels provides ample time for the United States to reconstitute additional forces, assuming a timely decision to initiate reconstitution steps. Consequently, many AC and RC units slated to respond to the less likely long-warning conflict can be removed from the force or be retained at greatly reduced readiness and resource levels (*e.g.*, cadre-type units). For crisis response, there is a continuing requirement for sufficient numbers of AC and RC forces ready to respond with rapid-deploying, reinforcing, and sustaining forces.

Policy

Reliance on the RC varies considerably from Service to Service and mission to mission. These variances are reflected in how each Service manages and employs its RC forces. Full-time support for RC units can range from virtually none to as high as 72 percent. Some RC units are expected to respond quickly and others are employed as follow-on forces. Some units maintain integrity when they mobilize and others provide individual augmentation to AC units. Observations from Operations DESERT SHIELD and DESERT STORM are influencing opinions on how RC forces are used and on the proper AC-RC mix. The size, structure, and readiness levels of AC and RC forces must consider factors including, but not limited to, cost, accessibility, required preparation time, and the time available to respond to various contingencies.

The most effective AC-RC mix is the one that provides, for a given investment, the balance of force size and availability that minimizes risk across the range of likely threats. Generally, AC forces should be used for rapid crisis response and will maintain the highest readiness levels possible. Selected RC units will also be required to maintain commensurately high levels of OPTEMPO and readiness in order to help deploy, support, and sustain early-deploying AC combat units responding to short-warning requirements. The bulk of the RC will be designated to support and augment AC forces. RC combat units will have their primary role in either protracted or concurrent major regional contingencies. In such cases, additional Reserves could be recalled to provide a sustaining base for forward-deployed forces.

The FY 1997 Total Force will be smaller. Impending fiscal restraints mandate reductions to RC as well as AC forces and the changing international environment allows these changes without significant increase in risk. These force reductions will, in turn, result in restructuring of AC and RC forces to support the emerging emphasis on forward presence, highly responsive crisis response forces, and reconstitution forces for long-warning

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conflict. Figure 11-1 depicts overall RC forces compared to AC forces. Table 11-2 contains a representation of the RC composition of each Military Service. RC force reductions will be minimized for those units providing essential support to AC forces and units with critical unique missions. These include mobility forces and units manned with personnel trained in critical skills such as aircrew, linguists, and technical specialists. Some RC unit manning levels can safely be reduced to very low cadre levels and reconstituted when needed. However, caution must be exercised to avoid reducing the size and readiness of AC and RC forces below the levels required for response to likely regional crises and contingencies. For reconstitution forces, innovative organizational concepts to retain equipment and trained leaders are needed, including cadreing and robusting. During peacetime, cadre units would maintain a core of trained leaders that would provide the structure around which a full-up organization could be established. Other concepts under consideration include assigning additional personnel to train with AC and RC units during peacetime. These additional personnel would become the pool of trained and experienced personnel around which new units could be reconstituted. "Nesting" by the Navy would designate training ships — training a nucleus of crews as the cadre upon which to build crews for "laid up" ships that could be readied for deployment when needed.

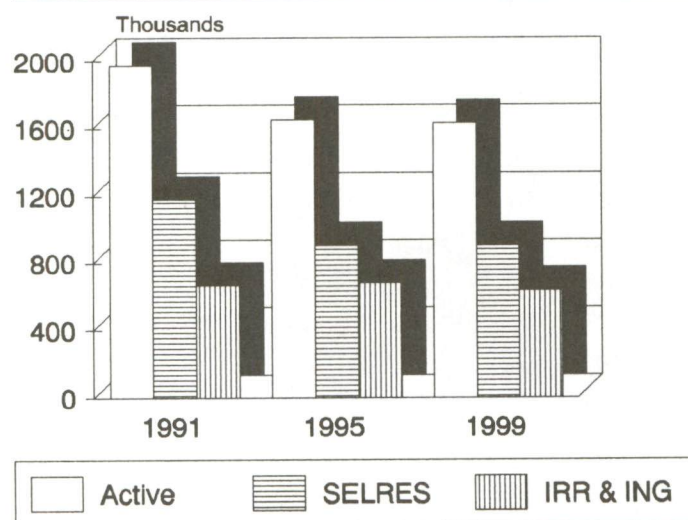


Figure 11-1. US Force Composition

Access

Reservists are accessed through voluntary and involuntary means. Volunteerism (10 USC §672d) provides force employment options, short of SELRES callup. Use of Reserve volunteers in support of operations in Libya, Grenada, and Panama further proved the value of volunteerism in no-plan scenarios. Volunteers used in Operation DESERT SHIELD provided key airlift, air refueling, reconnaissance, and combat communications support to the operation. Reserve volunteers also filled vacancies in water purification, civil affairs, intelligence support, linguistic support, port operations, port

Table 11-2. Reserve Force Composition

FORCES	FY 1991	FY 1993	FY 1997
US Army			
SELRES	776,000	551,000	551,000
IRR/ING	428,000	415,000	374,000
Retirees	550,000	577,000	593,000
US Navy			
SELRES	153,000	118,000	118,000
IRR/ING	128,000	143,000	143,000
Retirees	499,000	510,000	523,000
US Marine Corps			
SELRES	44,000	35,000	35,000
IRR/ING	60,000	72,000	69,000
Retirees	93,000	94,000	94,000
US Air Force			
SELRES	203,000	202,000	200,000
IRR/ING	52,000	52,000	52,000
Retirees	589,000	599,000	604,000

security, and other billets. Although volunteer arrangements are not an assurance that RC forces would be available to respond in adequate numbers with the appropriate grades and skills, recent responses have been favorable. Individual volunteers are usually assimilated into existing units. Forming entire units from volunteers, as experienced in Operation JUST CAUSE, does not usually result in cohesive organizations.

SELRES callup (10 USC §673b) is the Presidential involuntary activation of up to 200,000 Reservists for operational missions without a declaration of national emergency. SELRES callup was used for the first time for Operation DESERT SHIELD. Past reluctance to exercise SELRES callup may be eased because of the success of the callup experience during Operation DESERT SHIELD. On-going studies are evaluating options to change the callup authority to enhance accessibility to Reserve personnel. For Operation DESERT SHIELD, in FY 1991 only, the SELRES callup authority for combat units has been changed from an initial 90 days plus a 90-day extension to 180 days plus a 180-day extension. Because the capability of a combat force is inextricably linked to the availability and effectiveness of its support, excluding CS and CSS units from this new authority makes it almost impossible to execute.

Partial mobilization (10 USC §673a) is the expansion of the Armed Forces resulting from action by Congress (up to full mobilization) or by the President (not more than 1 million for 24 months) to mobilize Ready Reserve units, individual Reservists, and resources needed for their support to meet the requirements of a war or other national emergency involving an external threat to the national security. On 22 January 1991, this authority was invoked in support of Operation DESERT STORM.

Special Interest Areas

Missions

With approximately 45 percent of the US Armed Forces in the RC, reserves participate in most mission areas. The extent of this participation varies from single Reserve Individual Mobilization Augmentees to instances where RC forces contribute 100 percent of mission capability to the Total Force. Examples of significant RC contributions are shown in Table 11-3. Additional mission areas, unit types, and key skill areas in which the RC provides significant contributions include strategic airlift, SOF, aerial refueling units, intelligence, medicine, and linguists. US responses to recent contingencies in Grenada, Libya, Panama, and SWA have required RC participation in many of these mission areas.

Table 11-3. Reserve Contributions of 90 Percent or Greater

SUB-COMPONENT	UNIT TYPES
USAR and ARNG	TOW Light Antitank Battalions Heavy Helicopter Companies Pathfinder Units Civil Affairs Units Judge Advocate General Units Railroad Units
USNR	Logistic Airlift Squadrons (CONUS) Fighter Composite Squadrons (CONUS) Combat Sea-Air Rescue/Strike Rescue Inshore Undersea Warfare Units Naval Control of Shipping Cargo Handling Battalions
USAFR and ANG	Aerial Spraying Capability Strategic Defense Interceptors Aeromedical Evacuation Crews
USMCR USCGR	Civil Affairs Groups Deployable Port Security Units

Readiness

Readiness is the ability of forces and equipment to deliver the output for which they are designed and includes the ability to deploy and employ without unacceptable delays. The measurement of readiness of AC and RC units is a complex evaluation. When viewed together, measurable indicators — including SORTS data, personnel quality (measured in percentage of high school graduates and AFQT scores), individual skill qualification levels and personnel turnover, mobilization test results, readiness evaluations, and operational readiness inspections — provide a reasonable indication of readiness. Intangible factors such as leadership, morale, and unit cohesiveness are qualitative contributions to a unit's readiness. In general, readiness indicators of all components have improved as funding increased. The ability to sustain high readiness states is taxed by the increasing complexity of threats and missions and the associated training requirement. This increasing demand on finite training resources, coupled with safety, security,

and environmental constraints, make it difficult to "train like we intend to fight." The impact on RC readiness can be significant because of limited training time. Capitalizing on the benefits derived from simulations and other training innovations helps make optimum use of reduced training resources. Additionally, a high percentage of prior service accessions and high-quality recruits (over 90 percent are high-school graduates and meet AFQT category I-III standards) contribute significantly to RC readiness.

Ground Forces. Overall resourcing of ground forces has improved significantly since 1985. Much of the improvement is a result of the fielding of new equipment. RC personnel readiness levels have remained below those of the AC, mainly because of the difficulty in filling billets with MOS-qualified personnel. MOS qualification of RC personnel is a relatively intractable problem because of geographic dispersion problems and the training time required to maintain proficiency and enhance skills. Population densities around RC unit locations often do not support the numbers and types of skills required, and training time to achieve and maintain proficiency in some MOSs exceeds the time available to the part-time Reservist. Initiatives to correct these shortcomings include increased reliance on simulators and training devices, as well as contract training.

Training readiness levels have improved slightly since 1985 in both the AC and RC. Mostly because of limited training time per year, Army RC units generally are not expected to achieve a readiness level comparable to the AC in the Mission Essential Training List. Although reported readiness of the Army RC has improved, most RC units require additional training before undertaking their full wartime missions. Currently, units considered deployable may require up to 42 days of training to be able to perform their full wartime missions. This training time between notification and deployment is manageable for augmentation or rotation in slowly developing crises or for prolonged deployments. However, it precludes inclusion of Army RC combat forces in initial deployments for rapidly developing contingency operations. As long as RC utility is constrained by training limitations and accessibility, the responsibility to respond initially to contingencies with combat forces rests with the AC units.

Maritime Forces. The readiness of AC and RC naval forces is excellent, with 95 percent of units not in conversion or retrofit reporting able to perform all or major portions of their wartime mission. Virtually all Navy personnel are trained to execute a major portion of their mission. However, decline in equipment condition in both AC and RC units contributed to reduced overall readiness. The USMCR experiences personnel qualification difficulties because of geographic dispersion, insufficient population densities, and training time required for some high-technology billets. However, the quality of personnel accessions, equipment modernization, and the training standards achieved are comparable in both components of the Marine Corps. The USCGR does not yet report readiness with SORTS, but personnel and equipment shortages indicate potential readiness shortcomings in all areas. However, the success experienced during mobilization of USCGR Port Security Units for Operation DESERT SHIELD indicates high readiness levels in such units.

Special Interest Areas

Air Forces. Both components of the Air Force have achieved high readiness states. Active Navy and Marine Corps tactical air forces readiness declined slightly due to aircraft conversions. Unit reporting, inspections, and tactical and technical competitions — in those missions trained — reveal little difference among active Air Force, USAFR, and ANG units; about 95 percent of the flying units consistently report able to accomplish all or major parts of their wartime missions. The full-time support to RC air forces ratio contributes to unit readiness. Non-flying Air Force, USAFR, and ANG units reflect similar trends. USNR and USMCR flying units also have maintained relatively high overall C-levels. Personnel manning levels in all components' air arms have been consistently above 90 percent. Equipment on hand has increased or remained high in all components.

Costs

Some cost savings can be achieved if forces are moved to the RC structure. In general, manpower-intensive units (*e.g.*, light infantry divisions) offer considerable relative savings if operated as RC units. Capital-intensive units (*e.g.*, F-16 and F-14 squadrons and FFG-7s) offer lesser savings. The most recognizable direct dollar savings for an RC unit are achieved as a result of reduced manpower, OPTEMPO, and retirement costs. One-time transition costs associated with unit activation, deactivation, or transfer from AC to RC can overshadow recurring savings. In almost all cases, RC units have lower short-term and long-term ownership costs than do similar AC units. Exceptions may occur when RC units perform peacetime missions that require high OPTEMPOs. For example, one study indicates higher costs than AC units for those RC units performing strategic refueling missions and alerts. Direct cost comparisons suggest savings, but these considerations cannot override the requirements of readiness and availability for short-notice crisis response and the availability for forward presence and rotation that requires AC forces.

Conclusions

Significant differences exist among the seven Reserve components and variations occur in each active counterpart's use and management of RC forces. In general, forward presence requirements and the rapid response required of combat forces for contingencies — the basis for sizing AC and RC forces in the projected strategic environment — can best be satisfied with AC forces, although RC units can provide mobility forces and limited support forces. Large protracted or concurrent contingencies and long-developing crises are the situations for which RC forces — especially RC combat units — can be recalled, trained (if necessary), deployed, and employed to support, augment, reinforce, and sustain AC forces. The availability and responsiveness of RC units count heavily in determining the most effective AC-RC mix, but cost savings and the appropriateness of tasking to the "part-time" nature of the RC have been considered. RC forces will continue to be an integral part of the Total Force; however, changes to the overall military force structure will effect the RC as well as the AC as we optimize US combat capability while remaining within fiscal constraints.

COMMAND, CONTROL, AND COMMUNICATIONS

General

The smaller, highly mobile US forces envisioned for the 1990s will require robust, flexible C³ systems that are as mobile as the forces they support. The requirement for reliable, secure, jam-resistant, and enduring C³ connectivity will increasingly be met by the use of new-technology SATCOM.

Threats to Command, Control, and Communications

C³ systems can be vulnerable to a wide array of threats including physical attack, jamming, exploitation, deception, and nuclear effects. The most formidable threat to US C³ is the Soviet REC capability, which is a particularly pervasive threat. The threat from the Third World is increasing.

US Capabilities

Theater and Tactical Command, Control, and Communications. The past focus on Europe has yielded to regional challenges. SATCOM systems such as MILSTAR will provide required communications links that are highly resistant to jamming and nuclear effects. Planned systems are migrating towards "open system" designs capable of total integration in theater-wide tactical operations.

Peace, Tension, Crisis, and Brink of Conflict. Current C³ systems are adequate to support operations to counter terrorism, insurgencies, narcotics trafficking, and major crises. There is a growing requirement for C³ interoperability among executive agencies and departments and for interdepartmental data fusion. C³ will adequately support multiple concurrent crises through the 1990s. C³ systems may rely on augmentation by commercial and, to a lesser degree, allied communications to support US forces.

Regional Conventional Conflict. US forces must depend on highly mobile C³ systems of enhanced capacity such as SATCOM transceivers and lightweight position-locating receivers. Commercial and, to a lesser degree, allied communications may be needed to support current C³ capabilities in combat operations. C³ will be able to fully support US forces with sufficient lightweight, secure, interoperable equipment by fielding planned improvements through the 1990s.

Major Regional or Global Conventional Conflict. Current C³ capabilities fully support US forces in the initial stages of a conflict. Tactical C³ and SATCOM capabilities will improve through the 1990s with the fielding of several jam-resistant systems, including MILSTAR. Additionally, the fielding of new battle management ADP equipment, fusion programs, sensors, and position-locating systems will ensure C³ provides increased support to large-force operations.

Special Interest Areas

Nuclear Command, Control, and Communications. Fielding of new systems such as MILSTAR/SCOTT will improve NSNF C³. Present strategic C³ systems adequately support the US deterrent posture. Improvements will occur with the fielding of programmed mission planning and C³ systems in the mid- to late 1990s.

Trends and Deficiencies

Data transmission requirements are growing significantly. Existing transmission systems were not designed to support the emerging number of data transmission requirements, as evidenced by Operation DESERT SHIELD.

Theater and Tactical Command, Control, and Communications. Through the 1990s, C³ systems will provide the timely, accurate information required to best employ existing forces. Operational and national level requirements will be for systems of increasing capabilities. These improved C³ systems will help compensate for the loss of forward bases, force asymmetries, and mobilization deficiencies.

Nuclear Command, Control, and Communications. Current satellite systems have some susceptibility to jamming and nuclear-disturbed environments. Developmental programs are focused on increased capabilities for US nuclear C³ systems. The long-term solution to C³ requirements will be based on satellite systems, such as MILSTAR, that are survivable and jam-resistant.

Conclusions

The reduced Soviet threat has not diminished the demand for more capacity and speed in C³ systems. Operations DESERT SHIELD and DESERT STORM validate the assessments of C³ effectiveness in a major regional conflict. Lack of infrastructure in the Third World stresses existing systems, and existing limitations require constant updating. New systems, modernization, and effective use of available commercial assets must continue through the 1990s to ensure adequate C³ support. Further, the proliferation of nuclear weapons means that US nuclear forces will require C³ systems with increased capabilities. Planned systems should meet this requirement.

ELECTRONIC WARFARE

General

EW uses electromagnetic energy to determine, exploit, reduce, or prevent adversary use of the electromagnetic spectrum through damage, destruction, and/or disruption while retaining friendly use of the spectrum. The components of EW are ECM, ECCM, and ESM.

The EW Threat

Arms control agreements have reduced the EW threat in Europe. However, EW equipment built by Soviet and non-Soviet Warsaw Pact forces increasingly will be exported to Third World countries. Additionally, the emerging instability within the Third World, the proliferation of advanced conventional weapons systems, and the relative ease of acquiring sophisticated arms from Western, Soviet, and other sources will require that US forces be prepared to encounter the full range of military EW technology.

Soviet Capabilities. Soviet REC is an established military doctrine that is aimed at disrupting vital electronic command and control at critical moments in a conflict. It integrates the use of firepower, jamming, and deception. The Soviets have fielded many simple, reliable, and effective REC systems. Their ECM capabilities allow them to interfere with various Western military and commercial space systems and ground terminals as well as jam tactical communications, weapon control radars, and navigation and terrain-avoidance radars. Soviet air defenses use combinations of ECCM techniques and equipment to reduce their vulnerability, and Soviet forces have extensive communications and electronic intelligence collection capabilities to meet ESM needs.

Advances in computer processing and receiver system technology should improve the Soviet capability to receive, identify, and exploit certain types of US communications. However, the Soviets have had difficulties integrating the modern technologies required to process large amounts of data. The lack of capable microprocessors and design limitations inhibit flexibility and the ability to handle multiple tasks, process information, and sort signals in a dense battlefield environment.

Third World EW Capabilities. The Soviets have exported REC doctrine and EW equipment to many Third World nations; however, acceptance of REC doctrine by purchasers varies. Employment of Soviet REC in a Third World country's integrated air defense system depends on the amount of Western technology in use and the degree of integration of two different approaches to EW.

Generally, Third World nations possess neither the technology base nor the production means to improve their capabilities. Because they depend on outside sources, Third World nations are not expected to improve greatly in the foreseeable future. However, controlling the proliferation of Western technology is becoming increasingly difficult. Future low-intensity contingencies may not actually be very "low" in EW intensity.

US EW Capabilities

The United States has a full range of effective ECM, ECCM, and ESM capabilities, yet deficiencies exist. In ECM capabilities, most US aircraft have self-protection jamming assets to counter SAMs, air-to-air missiles, and tracking and guidance radars.

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ECM assets include air- and surface-launched chaff and flares that provide false targets. US surface combatants have ECM equipment designed to counter antiship missiles. Support aircraft provide the United States with an ECCM capability to jam a variety of hostile radars. US forces have the capability to jam both communication and radar signals through a broad spectrum. In ESM capabilities, the United States has extensive EW systems that can intercept, locate, and identify communications, radar, and other electromagnetic systems in support of both strategic and tactical operations. Deficiencies of various systems are systematically identified and technological improvements identified consistent with the threat.

Trends and Deficiencies

There is the probability that a declining US industrial base will cause applied US technology to lag behind the Soviets in certain critical areas. This can be rectified in part by identification of critical EW technologies and assistance to those US sectors involved in developing those technologies.

Depending upon the particular threat country's equipment, integration, doctrine, and training, the United States has a fair to very good stand-off jamming capability against air defense systems. The threats cover the full spectrum and must be addressed on an individual basis.

Assessment

Major planned improvements in US EW capabilities include all aspects of ECM, ECCM, and ESM. The introduction of unmanned aerial vehicles is expected to complement existing manned platforms for many missions. Destructive EW weapons and expendable payloads are also areas which will improve EW support to warfighting. There are scheduled improvements to the integration of EW systems for warning and self-protection on all front-line attack aircraft, most strategic bombers, and fighters as well as some transport aircraft. Joint initiatives will ensure interoperability and modular design to satisfy Service-unique applications for similar equipment.

CHEMICAL AND BIOLOGICAL WARFARE

US CBW Capabilities

While somewhat improved in selected areas, US CBW defensive capabilities continue to be an area of concern. The United States has no offensive BW capabilities, and defensive BW capabilities include personal protective equipment and a strong medical system.

US offensive CW capability has improved with the production and storage of binary chemical artillery projectiles. Binary technology provides advantages in weapon safety

and ease of transportation. However, the United States halted production of binary chemical weapons and now is in the process of an orderly drawdown of binary production capability. US defensive CW capabilities are effective but limited. Defensive equipment should be further modernized to increase efficiency and reduce the heat burden to users.

Other CBW-Capable Countries

Soviet Union. The Soviet Union continues to maintain the most extensive CW capability in the world. The Soviets have an enormous stockpile of chemical munitions that can be delivered by a variety of means. Their forces are well-trained and equipped in protection and decontamination techniques and have a large number of specially trained chemical personnel. The Soviets also have a BW R&D program and are believed to have the capability to produce biological weapons.

Proliferation. Approximately 20 countries have confirmed or suspected offensive CW programs and a slightly smaller number have confirmed or suspected offensive BW programs. These numbers are projected to increase over the next decade.

Effects of Arms Control on CBW Capabilities

Refer to the following section on Arms Control. The bilateral CW destruction agreement reached with the Soviet Union will limit US offensive CW capabilities. The United States will retain a smaller CW stockpile consisting of a mix of binary and unitary CW. Efforts to achieve a global CW ban continue and may eventually affect US CW capabilities.

Assessment

Until a verifiable, global CW ban is concluded, we must maintain a modest retaliatory CW capability and a robust CW defensive program in the Defense Program to deny a significant military advantage to any aggressor.

ARMS CONTROL

General

The primary US arms control objective is to enhance national security and global stability through effective, verifiable, and stabilizing arms agreements leading to reductions in nuclear, chemical, and conventional arms. Arms control efforts are in the best interests of the United States if they stabilize the strategic environment, enhance stability, and foster other cooperative efforts. Verifiable arms control agreements are essential as the United States reduces the size of its armed forces. Effective arms control agreements

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permit force reductions while still retaining the military capability required to deter aggression and achieve military objectives. They also help to channel the development and deployment of military capabilities along predictable lines.

Existing Major Arms Control Treaties and Agreements

Refer to Table 11-4. Most arms control treaties to which the United States is a signatory deal with weapons of mass destruction.

Nuclear Weapons Treaties. The Limited Test Ban Treaty was the first effort at controlling nuclear weapon testing and its effects on the environment. This treaty was enhanced by the development of the Threshold Test Ban Treaty, which set a threshold of 150 kilotons for nuclear weapon testing and limits testing to designated sites, and the Peaceful Nuclear Explosion Treaty, which governs nuclear explosion tests for peaceful purposes. The Non-Proliferation Treaty is intended to stem nuclear weapon proliferation. The INF treaty leaves the United States with no ground-launched INF systems; however, this reduction has no significant net impact on US military capabilities because of the simultaneous elimination of corresponding Soviet systems, the reduced likelihood of a conflict in Europe, and the low requirement for these weapons in other theaters.

CW Agreements. A bilateral destruction and non-production agreement between the United States and the Soviet Union was signed in June 1990. When approved by Congress, this agreement will require the two countries to reduce their present CW stockpiles to a lower and equal level, cooperate in inspection procedures, and share destruction technology. Additionally, this agreement calls for a cessation of CW production by both sides.

Other Treaties. The CFE Treaty was signed on 19 November 1990. Once it is ratified and enters into force, CFE will have a profound impact upon the United States and NATO. When the Soviet Union and its former Warsaw Pact allies reduce forces to CFE levels, a massive attack by the Soviet Union, with or without the East European nations' support, would not be possible without an extensive and lengthy mobilization. Unfortunately, serious problems related to Soviet interpretation of treaty elements and provision of data have arisen, calling into doubt the prospects of ratification. These data and counting problems, along with withdrawal of Treaty-limited equipment prior to signature, need to be resolved.

Major Arms Control Negotiations

Refer to Table 11-5 on page 11-18. Progress has been made within the last year in the development of some major arms control treaties.

The ongoing START negotiations should result in an agreement that increases stability. START will reduce and limit the strategic nuclear systems posing the greatest danger

Table 11-4. Major Existing Arms Control Treaties

TREATY	ENTRY INTO FORCE	TREATY HIGHLIGHTS	TREATY MEMBERS	REMARKS
Limited Test Ban Treaty	10 Oct 63	Bans nuclear weapons tests or nuclear explosions in the atmosphere, space, or underwater.	Most countries. Key exceptions: France and China	A Jan 91 Review Conference proposal to change the LTBT to a CTB was unsuccessful.
Non-Proliferation Treaty	5 Mar 70	Cornerstone of international efforts to prevent further spread of nuclear weapons.	Currently 141 participants. Key exceptions: France and China	Comes up for extension of a specific period of years or indefinitely in 95.
Antiballistic Missile Treaty	3 Oct 72	Limits ABM deployment areas to one, thus ensuring penetration of other nations' retaliatory nuclear missiles.	United States and Soviet Union	US R&D continues within treaty limits.
Biological Weapons Convention	26 Mar 75	Parties pledge not to develop, produce, stockpile, or acquire biological agents or toxins other than limited quantities for defensive or peaceful research.	Most countries. Key exceptions: France and China	No provisions made for verification procedures.
Intermediate-Range Nuclear Forces Treaty	1 Jun 88	Eliminates ground-launched missiles with ranges between 500 and 5,500 km, launchers, and support structure.	United States and Soviet Union	All treaty-directed items eliminated by 31 May 91. On-site inspections and portal operations to continue until 31 May 01.
Bilateral Chemical Weapons Destruction Agreement	Projected for NLT 30 Jun 91	Reduces CW stockpiles to lower, equal levels, shares destruction technology, and commits to an end of CW production.	United States and Soviet Union	Signed on 1 Jun 90, subject to congressional approval. Destruction protocol in work.
Conventional Forces in Europe	Projected for late 91	Reduces and sets limits for conventional armed forces equipment in Europe.	NATO and Warsaw Pact countries	Ratification called into question by Soviet interpretation of treaty elements and provision of data issues.

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Table 11-5. Major Arms Control Negotiations

TREATY	SIGNING	PURPOSE	MAJOR ISSUES SETTLED	MAJOR ISSUES REMAINING
Strategic Arms Reduction Talks	Projected for early 91	To reduce strategic nuclear force levels of the United States and the Soviet Union.	Limitations Duration Draft text General inspection and verification Noncircumvention Draw-down schedule Third-country basing ABM linkage	Suspect site inspection New types definitions Data denial Downloading Stage dimensions Warhead counting for future types Size criteria for Treaty-limited items Inspection quotas Site diagrams Air-launched ICBMs and SLBMs
Confidence and Security-Building Measures Negotiations	Set of measures signed 19 Nov 90; additional measures under negotiation.	To reduce misunderstanding, miscalculation, and chance of armed conflict in Europe.	New measures Unusual military activities Improvements to Stockholm 1986 Accords Information exchange	Infrastructure upgrading Increased access for accredited military personnel Further improvements to Stockholm Accords
Chemical Weapons Convention	undetermined	To globally ban the production, storage, or use of chemical weapons.	Duration of treaty Pre-draft status	Verification Retaliation Sanctions Disputes Assistance

of sudden nuclear attack — offensive ballistic missiles, particularly heavy ICBMs. When coupled with strategic modernization, START could add to US national security by lowering the large Soviet ballistic missile weapon inventories by capping future strategic growth, thereby helping to prevent a potential strategic imbalance.

International efforts have been ongoing for many years to achieve a global CW convention that bans the development, production, stockpiling, transfer, and use of these weapons. Progress has advanced to the pre-draft status, but significant unresolved issues remain. At the heart of the issue is the need for effective verification of such a treaty. Although the prospects for signing a global CW agreement within the next five years are good, the prospects for an early entry into force are doubtful. In addition to doubts about

verification, not all CW-capable nations — for example, Iran and Iraq — have agreed to a CW ban. A global CW ban treaty, if effective, would be in the best interests of the United States; however, improved technology is required to ensure compliance verification.

Other treaties that are being negotiated include the Open Skies treaty — to “challenge the participants to greater openness and transparency through the use of unarmed aerial surveillance of national territories” — and the ongoing Vienna talks on CSBMs — intended to improve military contacts between nations, lower the threshold for mutual notification of large-scale military activities, and make certain military activities more accessible. At the November 1990 Paris Conference on Security and Cooperation in Europe, a politically binding CSBM agreement was signed which improved and expanded the 1986 Stockholm document. Some new issues are still being worked.

Trends

Future arms control negotiations will likely focus on weapons capability and national production means. Such measures should restrict the ability of nations to sustain combat because of production limitations. To ensure compliance in production constraints, future negotiations will probably feature intrusive verification provisions.

Assessment

Existing treaties will continue to provide the results for which they were intended. The achievement of START and CFE in the near future may lead to follow-on treaties that will further reduce strategic nuclear and conventional force levels. Such actions would be in the interest of the United States if they permit further US force reductions and lead to strategic stability. However, these arms control agreements will not reduce the threat in theaters outside of Europe, most notably SWA and South America.

SECURITY ASSISTANCE

General

Security assistance is an instrument of US national security policy designed to promote our national interests by supporting formal agreements, other nations that confront threats, other nations to which access would enhance the global mobility of US forces, and other nations where prudent investment can prevent subversion or other broad problems.

International Defense Cooperation

General. Defense cooperation is a generic term for the range of activity undertaken by the Department of Defense with its allies and other friendly countries to promote

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international security. Such activity includes, but need not be confined to, security assistance, industrial cooperation, armaments cooperation, foreign military sales, training, logistics cooperation, cooperative R&D, foreign comparative testing, and host-nation support.

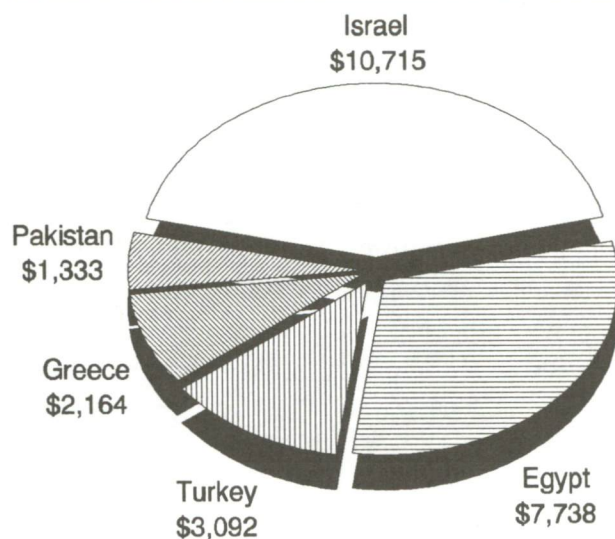
International cooperative programs with allied and other friendly nations constitute an increasingly important element of US national security and defense acquisition strategy in the post-Cold War era. These programs also seek to recognize two new realities: that we could benefit from access to allied military technology and systems that could enhance the buying power of scarce R&D dollars; and that we could address growing concerns about the health of US defense and civilian technology and industrial bases.

Objectives. DOD participation in international cooperative programs with allied and friendly nations should be designed to achieve the following objectives:

- ❑ Reciprocal access to, use of, and protection of the best technology, goods, and services developed by the United States and its allies and friends.
- ❑ Adoption by allied or friendly nations of standardized or interoperable equipment, uniform or compatible logistics support arrangements, and common operational concepts, doctrine, and tactics.
- ❑ Making the most efficient use of the scientific, technical, and industrial resources available to participating nations, leading to a reduction in wasteful duplication of RDT&E, production, and follow-on support of defense equipment.
- ❑ Greater investment by allied and friendly nations in modern conventional defense equipment.
- ❑ Creation of additional overseas sources of supply to improve offshore logistic responsiveness and the in-country mobilization base.
- ❑ A more efficient market for trade in defense technologies, goods, and services among the United States and allied and friendly nations by reducing buy-national restrictions, exploiting economies of scale, and improving industry-to-industry collaboration.

Trends and Deficiencies

During the years of aggressive Soviet support for Middle Eastern countries and Marxist regimes worldwide, the United States entered into major long-term security assistance agreements with such frontline or basing-rights nations as Turkey, Israel, Egypt, Portugal, the Philippines, and Pakistan. The security assistance program in the early to mid-1980s was structured to support these commitments. These commitments continue, even though security assistance funding has been reduced annually by Congress, resulting in a decreasing number of countries receiving an increasing portion of available funds. Figure 11-2 shows the top security assistance recipients since 1986, while Figure 11-3 shows the trend in total security assistance expenditures for the same period. Funding beyond the



NOTE: Top recipients since 1986 in millions of dollars.

Figure 11-2. Cumulative Security Assistance Receipts

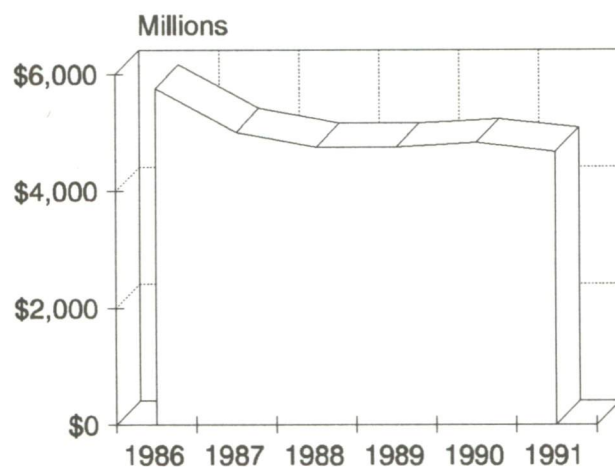


Figure 11-3. Total Security Assistance Expenditures

top recipients has been largely allocated to CI and CN efforts in Latin America, with only minimal amounts available to sustain foreign military sales programs elsewhere.

Assessment

This trend is unlikely to change in the near term, because the security assistance budget is expected to decrease. While the current crisis in SWA will lead to a reassessment of global mobility, access, and regional balances, it is likely that many of the current major recipients will retain priority — or be allocated an even greater share. The CN effort will continue with preset minimum funding levels. Program flexibility will be gained at the expense of already decreasing funding for counterinsurgency efforts and the minimal ongoing sustainment programs for other nations.

Special Interest Areas

COUNTERNARCOTICS OPERATIONS

General

The affliction of illegal drugs strikes at the heart of the nation's values. As a result, one of our principal foreign policy objectives is to eliminate the flow of illegal drug substances into the United States. DOD efforts in CN operations complement those of the Department of State, US law enforcement agencies, and cooperating foreign countries. An effective attack on the flow of illegal drugs depends upon action at every phase of the flow: in the countries that are the sources of the drugs; in transit from the source countries to the United States; and during distribution in the United States. The US Armed Forces support each of these phases.

Principal CN Roles and Functions

CN Support at the Source. USSOUTHCOM, in conjunction with USLANTCOM, USPACOM, DIA, country teams, cooperating host nations, and other US agencies, provides CN support in its area of responsibility by strengthening the internal security, political will, and institutional capabilities of cooperating host nations; combating the production and trafficking of drugs through operational support to host nations; and increasing the effectiveness of US and host-nation law enforcement agencies. Tactical radars and advanced communications equipment have been deployed to detect and monitor drug traffic; tactical analysis teams have been established to fuse and disseminate real-time intelligence information and develop target packages; and training and equipment have been provided by various programs to improve host-nation capability to fight well-armed drug traffickers.

CN Support in Drug Transit. The Department of Defense is the lead agency for the detection and monitoring of aerial and maritime transportation of illegal drugs to the United States. These operations are conducted by USSOUTHCOM, USLANTCOM, NORAD, USPACOM, and FORSCOM, focusing on the Caribbean, Gulf of Mexico, and routes leading to the US southwest border.

A variety of forces assist in the detection and monitoring of suspect aircraft and surface vessels. This process of "sorting" suspect traffic gives law enforcement agencies time to react and to position interdiction and apprehension assets. Air assets include radar platforms and interceptors. Land-based radars and aerostats have created choke-points through which smuggling aircraft must operate. Mobile radar platforms, such as ships with three-dimensional radar operating in the southern Caribbean and eastern Pacific, fill gaps in radar coverage. Airborne early warning aircraft further narrow the gaps and respond to cued intelligence. Interceptor aircraft sort and identify air contacts.

CN Support within the United States. FORSCOM, in conjunction with USLANTCOM, USPACOM, NORAD, and other supporting CINCs, supports law enforcement agencies at all levels of the government. The Department of Defense assists with training, reconnaissance, command and control, planning, and logistics for CN operations. In appropriate cases, DOD personnel and equipment will be detailed directly to law enforcement agencies.

Command and Control. All involved commands perform C³I functions to coordinate the transition from aerial detection and monitoring to interdiction and apprehension; perform intelligence exchange and coordination with law enforcement agencies and cooperating countries; coordinate handoffs for host-nation interdiction efforts with the appropriate commands and agencies; and coordinate integration of the regional C³I network with all agencies.

Assessment

The CN environment has changed since the early efforts of the US Customs Service and US Coast Guard to push drug traffickers off the Florida coast. Drug smuggling operations have increased along the southwest border of the United States; because of increased detection and monitoring, drug smugglers have switched to new aerial trafficking routes. New methods and means of operation by US CN organizations are required to successfully interdict these new routes.

Although the CN share has grown in these times of shrinking budgets, DOD missions and involvement continue to grow even faster. The US Armed Forces will be heavily involved in the ongoing and growing CN efforts for the foreseeable future.

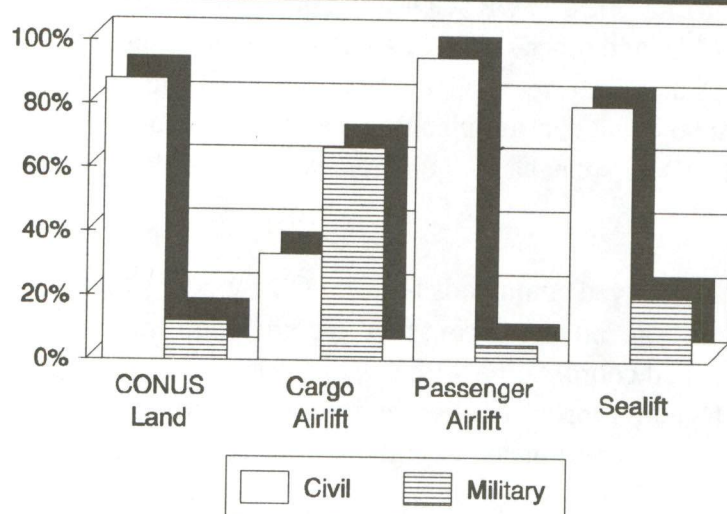
MOBILITY

General

As a country with extensive political, military, and economic obligations and interests throughout the world, the United States must possess a concomitant ability to move forces and their sustaining supplies rapidly from CONUS to and within potential or actual war-fighting theaters. Operations JUST CAUSE and DESERT SHIELD amply demonstrate the importance of adequate mobility. Indeed, mobility undergirds several elements of our central military strategy concepts, such as forward presence, crisis response, and reconstitution.

Mobility is divided into intratheater (within CONUS or a theater) movement and intertheater (between CONUS and a theater or between theaters) movement. As a matter of national policy, the United States relies on civil sector mobility capability. Refer to Figure 11-4 on the following page.

Special Interest Areas



NOTE: The percentages, which combine a number of dissimilar assets, are approximate. The military portion of CONUS land assets includes military-owned helicopters, heavy equipment transporters, and flatcars. The military portion of airlift includes all strategic assets. CRAF through Stage III is included in the civil airlift capability. The military portion of sealift includes the FSSs, hospital ships, aviation support ships, and the RRF.

Figure 11-4. Current Reliance on Civil Sector and Military Assets

Intratheater Mobility

The CONUS intratheater capability is mostly adequate. Studies of OPLAN requirements, compared with commercial assets and empirical data from Operation DESERT SHIELD, show commercial industry able to support DOD movement requirements. Although the overall capability of the commercial industry is excellent, it does require warning time to gather assets where they are needed, especially for high-volume movements. A future shortfall will be the availability of heavy-lift railcars capable of carrying over-size vehicles like the M1 tank and M88 tank retriever. Because these aging cars are not highly profitable in the commercial sector, they are not likely to be replaced in kind.

In contrast to the United States, intratheater support infrastructure varies from region to region. In Europe, Korea, and Saudi Arabia, the infrastructure is adequate. In other theaters, such as in Latin America, it is far from adequate. Many of these regions' aerial and sea ports are austere. Shortages in materiel handling equipment and aerial port manning limit planned cargo flow.

Intertheater Mobility

Intertheater movement consists of the elements of the strategic mobility triad — pre-positioning (ashore and afloat), airlift, and sealift. The United States is dependent upon all elements of the strategic mobility triad for power projection. Pre-positioning, either afloat or ashore, offers reduced lift requirements, but entails risks (such as being in the wrong location), presents storage problems, and necessitates dual-

equipping of units. Airlift offers speed and flexibility but is airfield-dependent and expensive. Sealift can deliver massive amounts of materiel but is seaport-dependent and may require several weeks en route. Additional intertheater movement of forces is provided by amphibious lift assets that, unlike conventional sealift, provide a forcible-entry capability that does not require conventional seaports or a benign environment.

The preferred mix of these interdependent elements depends on scenario factors such as threat force; size of the deploying force; amount of warning time; distance from CONUS to crisis location; conditions at destination airfields, seaports, and beachheads; and political, economic, and fiscal considerations. Figure 11-5 provides a notional profile of cumulative lift over time for the strategic mobility triad.

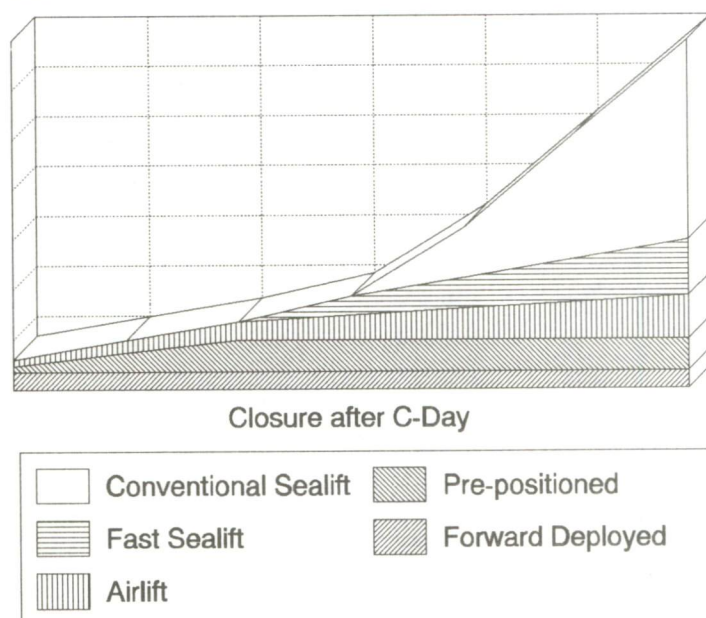


Figure 11-5. Cumulative Lift over Time (Notional)

Mobility Improvements

Although many improvements in strategic mobility have occurred during the last decade, some significant shortfalls and deficiencies remain. Many of these have been discussed in some detail in earlier chapters of this document. In order to obtain a broader view, overall strategic mobility capabilities were examined in comparison to the mobility goals established in DG FY 90-94. We recognize that the scenarios on which these DG goals were established are no longer valid; these goals currently are being reevaluated by the ongoing congressionally mandated Mobility Requirements Study. This study will examine new options for airlift, sealift, amphibious lift, and pre-positioning in the new environment, as well as include a mobility analysis of Operation DESERT SHIELD. Thus it must be stressed that the use of the DG goals is for illustrative purposes only to provide a rough order of magnitude comparison.

Special Interest Areas

Pre-positioning. Pre-positioning of equipment and materiel has demonstrated its value, particularly deterrence, in several areas of the world. Key examples of the contribution of pre-positioning to deterrence are the Army POMCUS sets in Europe; the Marine Corps' MPS program; and the Army, Navy, and Air Force APF ships in the Indian Ocean for Operation DESERT SHIELD. Table 9-2 in Chapter 9 provides information on current pre-positioning. Although some elements of pre-positioning are being reevaluated, current pre-positioning programs generally are being retained.

Airlift. The status of strategic airlift reflects both capability and deficiencies. As Operation DESERT SHIELD has demonstrated, existing organic military lift capability is very responsive, and the CRAF program can provide a substantial number of aircraft quickly through a small number of carriers. Nevertheless, several serious airlift deficiencies persist. Although the latest DOD airlift capability goal is 66 MTM/D for mobility and sustainment, the current capability of MAC, SAC, and CRAF combined is approximately 48 MTM/D. With the fielding of the C-17, capability rises to 55 MTM/D, a figure constrained by the reduced C-17 procurement program (from 210 to 120 aircraft). Associated problems are insufficient peacetime agreements for the use of foreign airfields, host-nation ground support personnel, and the impending obsolescence of the C-141.

Sealift. An examination of this element reflects both capability and deficiencies. Generally, the US port capacity is adequate to outload military cargo subject to adequate warning to permit the civil sector to free up port facilities. However, a notable exception is the lack of a US Government-owned containerized ammunition outload facility on the US west coast. During the 1980s, the conversion of eight Sealand SL-7 vessels, the increase in the number of ships in the RRF, and the partially completed development of the LOTS Program have provided enhanced sealift capability. LOTS techniques provide flexible options for deployment into less well-developed theaters. On the other hand, several aspects of the sealift element of the mobility triad are deficient.

First, Figures 11-6 through 11-8 show the declining sealift capability in comparison to the DG FY 90-94 goal. Figure 11-9 on page 11-28 shows trend data from 1970 and illustrates the erosion in the number of US militarily useful dry cargo ships.

Second, in response to free market forces, a predominant percentage of commercial ships and ports today are far less appropriate for most military cargoes. Projections of future ship inventories show that by 1997 over 80 percent of the US flag fleet will consist of non-self-sustaining container ships (*i.e.*, ships that require specialized port loading and unloading equipment for containerized cargo). Few of these container ships have been modified to promptly accept the seashed and flatrack modifications that would be used to handle UE. The Navy's flatrack and seashed program buy, to be completed in FY 1992, will provide 25 ship sets to convert containerized ships into useful UE ships. The additional 2 million square feet of available shipping area will add a small increase in UE capability in FY 1995 and maintain capability in FY 1997. As a concomitant change,

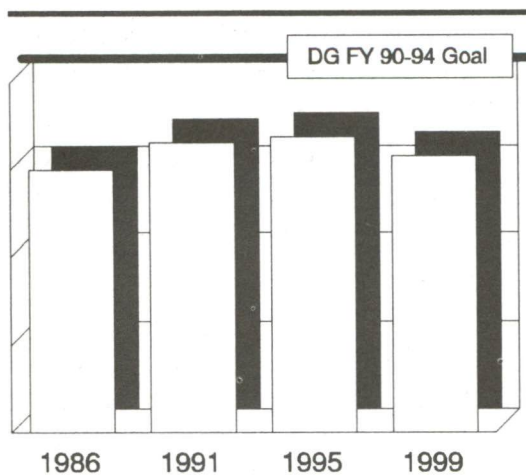


Figure 11-6. UE Capacity and Goal

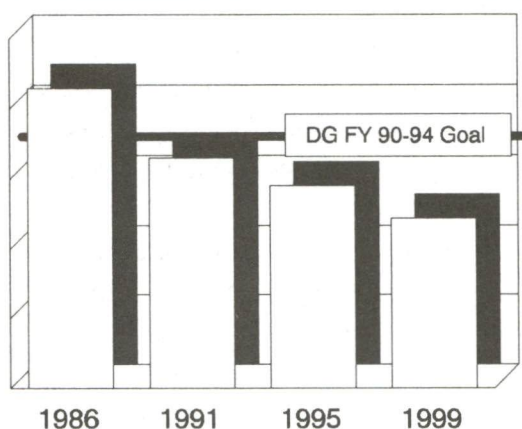


Figure 11-7. Containerized Cargo Capacity and Goal

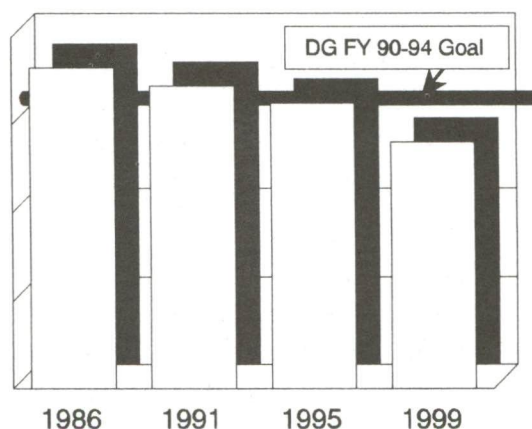
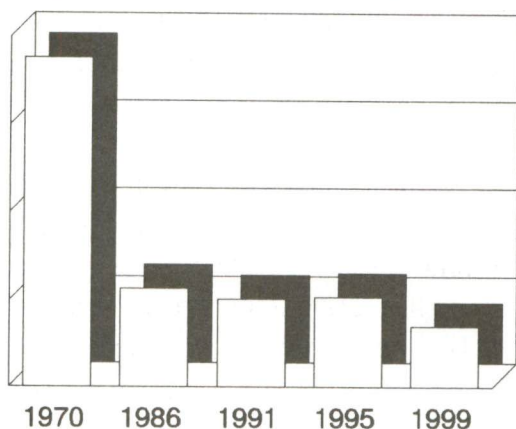


Figure 11-8. POL Cargo Capacity and Goal

Note: The DG FY 90-94 goals were composed for scenarios no longer considered realistic. Nonetheless, they provide interim standards against which capability can be measured. An ongoing Mobility Requirements Study will examine capabilities based on more modern assumptions.

“superports” designed for these large containerized ships appear to be the trend. Both trends significantly decrease the military utility of the US-flag fleet in supporting deployments to parts of the world with austere port facilities.

Special Interest Areas



NOTE: These figures include MSC, RRF, US-flag fleet, NDRF, and EUSC ships.

Figure 11-9. Numbers of Militarily Useful US Dry Cargo Ships

Although now adequate, the number of US merchant mariners is declining. By the end of the decade, a merchant mariner shortage will exist in a full mobilization surge of sealift capability and in the sustainment phase of a deployment. A critical need exists now for steam engineers for RRF ships. However, the US Maritime Administration has plans to implement a Maritime Reserve Program that should mitigate, to some degree, steam engineer shortfalls.

Last, the US shipbuilding and repair industry is seriously deficient and continues to decline.

OPERATIONS DESERT SHIELD AND DESERT STORM

General

The crisis in the Middle East provides important lessons on the changing international politico-military environment, and initial assessment of Operations DESERT SHIELD and DESERT STORM provides insight into the US ability to mobilize, deploy, employ, and sustain in a regional crisis. However, two important caveats must be made. First, the current crisis has not yet been fully resolved. Second, although both operations have been successful to date — Iraq was deterred from attacking Saudi Arabia and was subsequently ejected from Kuwait — the current outcome could have been altered had Iraq continued its attack into Saudi Arabia following the invasion of Kuwait.

Deployment

Operation DESERT SHIELD clearly demonstrated the importance of strategic mobility to the success of crisis response operations. This deployment — the largest since Vietnam — was an impressive success for the most part, but it was a lengthy process, with a

resulting increase in risk. Had Iraqi forces attacked into Saudi Arabia prior to the arrival of significant US forces and supplies, the defense of the oilfields and key ports would have been difficult and costly at best.

Sealift. The sealift operations generally were successful, although there were some problems and some planning factors turned out to be too optimistic. Additionally, several ships were slowed by mechanical problems. US and foreign ships were chartered because they provided more capable ships than those remaining in the RRF and at a lower cost. Finally, the problem was complicated by a request received early in the deployment to ship allied forces to the theater. Such requests can be expected again during future multi-lateral actions.

Airlift. Strategic airlift was used primarily to move high-deterrent-value combat forces, such as tactical fighter squadrons, an MPF MEB, and the 82nd Airborne Division. Early in the deployment, it became evident that available strategic airlift assets were insufficient to deliver the required number of troops in the desired amount of time; CRAF Stage I was activated in response.

Pre-positioning. The value of pre-positioning equipment (MPF and APF) was demonstrated convincingly. The ability to quickly deploy two MEBs into Saudi Arabia provided a degree of deterrence. Because of the anticipated need to have a large, modernized, heavy force in place rapidly to deter and defeat future aggression in the Middle East, various pre-positioning options for an Army heavy division's equipment are being explored.

Employment

Final assessments about the employment of forces in Operation DESERT STORM cannot be made until the conflict is completely resolved. Nevertheless, some general observations about US capabilities in potential future conflicts already have been made.

Proliferation of High-Technology Weapons. Operation DESERT STORM has highlighted the extensive and fairly modern array of high-technology weapons and weapons of mass destruction that are either under development in Iraq or already in their arsenal. Probably most publicized has been the robust Iraqi CW program. The reports on Iraqi weaponry highlight the increasing proliferation of high-technology weaponry in this region and around the world. Despite Iraq's poor use of available assets, we can conclude that the United States can no longer expect an overwhelming technological advantage in potential conflicts with some Third World countries.

Command, Control, and Communications. The austere C³ infrastructure in the Arabian Peninsula required an unprecedented buildup of military, commercial, and allied capacity in the AOR to support USCENTCOM's requirements. Basic telecommunications

Special Interest Areas

services were established with sufficient speed to support deterrence operations. Upgradings and refinements to these systems are under way that will ameliorate remaining shortfalls in capacity.

Use of Reserves

RC forces have provided valuable support throughout Operation DESERT SHIELD through volunteers and units ordered to active duty. However, this operation has raised questions about the use of round-out brigades for Army combat units — and most RC combat or CS units — in contingency operations that, by nature, require rapid mobilization. Most RC units require additional training time upon activation before deploying. This is particularly true of large organizations where collective unit skills require more training time than individual skills. SELRES callup (10 USC §673b) limits the duration of callup to 180 days, limiting the useful employment of Reserves in crisis response operations because of the time necessary to mobilize, train, deploy, employ, redeploy, and draw down.

Congress passed special legislation (Section 8132, FY 1991 DOD Appropriations Act) that permits the President to authorize the activation of RC combat units for up to 360 days. The statute is limited in scope, and applies only to RC combat units (not defined in the statute) during Operation DESERT SHIELD. This authority was never used. On 18 January 1991, the President authorized activation of up to 1 million members of the Ready Reserve (including the SELRES) for up to two years under 10 USC §673a. Reservists who had been called up under 10 USC §673b were continued on active duty under the provisions of 10 USC §673a.

Assessment

A variety of reasons, including the maintenance of international coalitions and the need to retain US domestic support, highlight the need to resolve future crises in an expedient manner. This in turn highlights the requirement for a robust strategic lift capability and the selective pre-positioning of equipment and sustainment assets, in order that our forces can be deployed in the appropriate size and mix and within the desired time frame. The technologically advanced nature of Iraq's weapons and obstacles foretell the increased lethality US forces can expect in future conflicts around the world, as well as the importance of continued modernization. Potential shortfalls identified in logistics support — even before a shot had been fired — emphasize the continued improvements and modernization that must be made within the US logistics system to support our forces in future crises.

Part III. Assessment

1991 JMNA

Chapter 12. Assessment

TRENDS IN A NEW WORLD ORDER

The Cold War was a major factor governing previous US force structure and investment decisions, and, despite many changes, the Soviet Union remains a formidable adversary with large, technologically sophisticated forces. Until recently, the Soviet political leadership had been willing to allocate resources to their armed forces and use military force to achieve their political goals. However, current events in the Baltic republics indicate that the Soviet transformation is not yet complete; we cannot abandon our concern over a reversal of recent trends.

The foregoing discussions focused on the strategic environment, the confluence of threats, national security objectives, and discrete analyses of the force and related capabilities. This final chapter is a synthesis of the previous work, examining overall force implications and risks inherent in the Defense Program in the context of the changing world and mandated economies in defense spending.

Nonetheless, change is in the air. The prospect of a global war is more remote now than at any time since 1945. Currently, the strife within the Soviet Union suggests that it lacks both the strength and the coherent political will to threaten US interests. Future threats to American security interests seem far more likely to arise from regional conflicts, instabilities, and terrorism than from the traditional vision of a general war against the Soviet Union. Achieving stability in a new environment where the threat may take on a variety of attributes presents different security challenges to the United States.

A qualitative assessment of trends in the current strategic environment is depicted graphically in Figure 12-1 on the following page. The hollow rectangles represent the relative positions of an element of national power, interest, or threat over the past 5 years. The shaded rectangles express a macro assessment of the trends expected over the next 5 to 7 years. Collectively, these trends are mixed. Formal and informal economic groupings are expected to gain importance as forums for collective policy, while at the same time, traditional military alliances most likely will wane. There is a high likelihood that weapons of mass destruction will proliferate and domestic pressures will increasingly press for further economy in spending. On the other hand, the risk of global war is much lower than it has been in decades.

Assessment

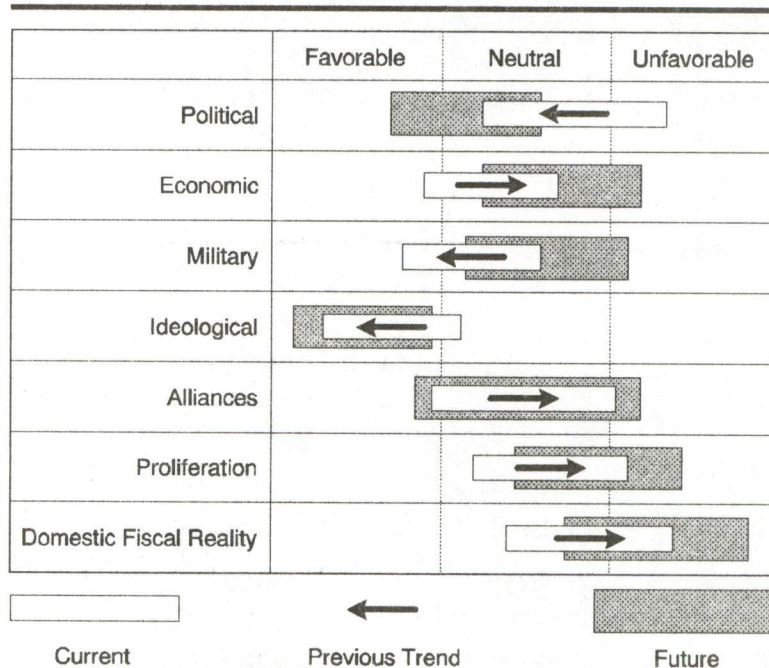


Figure 12-1. Trends in the Strategic Environment

IMPLICATIONS FOR FORCES

The Defense Program has been shaped in the context of the strategic environment; it meets most of our enduring needs. The program attempts to minimize risk, preserve options against uncertainty, and signal intent to retain a position of leadership. It provides adequate strategic forces for deterrence stability through a capable and modernized offensive force but only marginal resources for R&D to offset strategic defense deficiencies. The Defense Program provides conventional forces for ground, air, and maritime presence in regions crucial to US interests and RC forces to support long-term commitments. However, although there are sufficient contingency forces, they have a marginal reinforcement capability for worldwide response, and there is a declining reconstitution base that deserves attention.

ENDURING DEFENSE NEEDS

- ❑ Strategic Forces
 - Modernized Triad*
 - Strategic Defense*
- ❑ Forward Presence
 - Atlantic Forces*
 - Pacific Forces*
- ❑ Reinforcing and Crisis Response Contingency Forces
- ❑ Reserve Forces
- ❑ Reconstitution Base

RESOURCING THE FORCE

Although the Defense Program provides significant funding for force structure and investments, a substantial number of critical programs are underfunded or unfunded. Even though the Soviet threat has declined, risk in the Defense Program is increasing

because of key vulnerabilities emerging in the defense industrial base, underfunded R&D, sustainment shortcomings, strategic mobility shortfalls, and strategic defense deficiencies. This situation resulted in part from the negative real growth in defense spending which began in FY 1985 and is projected to continue through FY 1999 at an accelerated rate.

DIMENSIONS OF RISK

The assessment of risk that follows in this chapter was derived by analyzing the relationship of the variables shown in Figure 12-2 and assessing their impact on risk. Of the variables, force capability is the only one that can be directly affected through budget and program decisions. Warning time, political decisions, and the threat are underlying assumptions in the analysis and are not directly affected by DOD processes.

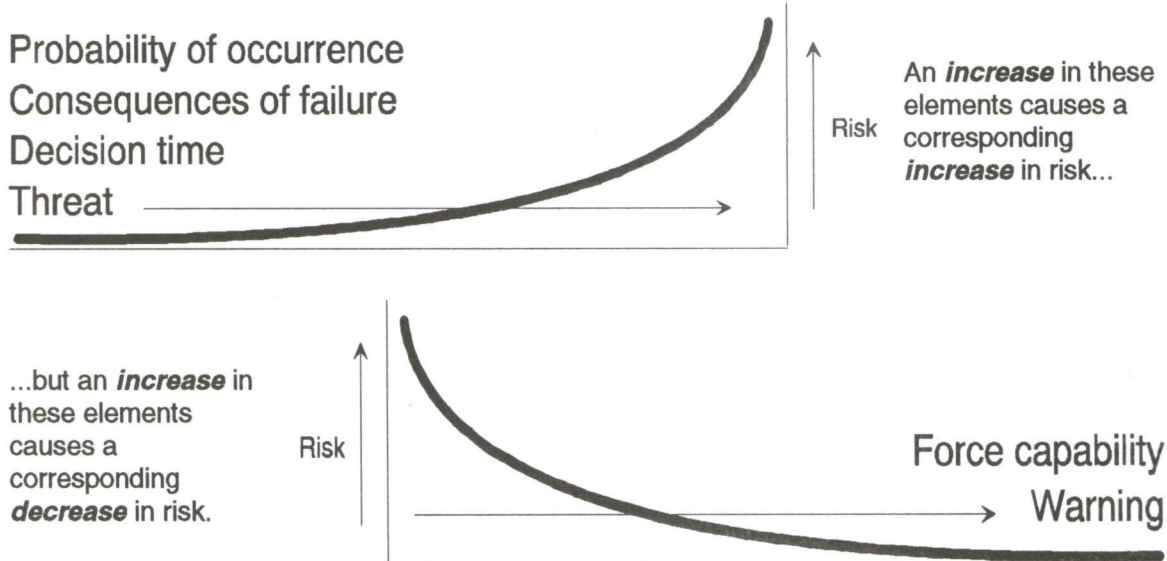


Figure 12-2. Variables in the Risk Equation

RISK ASSESSMENT

Forward Presence

In peacetime, given the range of threats to US interests throughout the world, the potential is great for US forward presence forces to become involved in a crisis; the consequences of failing to accomplish US national security objectives vary. The programmed forces through FY 1999 provide a minimal and declining forward presence to accomplish US national security objectives. Force reductions planned through FY 1999 will decrease capability, create an image of US global withdrawal, and reduce US influence. Furthermore, fewer forward-deployed forces limit response options.

Assessment

Strategic Forces

US offensive strategic forces provide sufficient capability for deterrence. US strategic defensive forces have only the marginal capability of early warning of a strategic attack. Continued Soviet modernization could increase the strategic threat to the United States.

Space Forces

Space forces remain critical to our national strategy. With the exception of kinetic-energy ASAT and SBWAS programs, most systems are reasonably well-resourced to meet requirements through FY 1999. Our launch infrastructure requires modernization to streamline the launch process and improve response time.

Crisis Response

In assessing the risk associated with our capability to respond to various crises, the scenarios described in Chapters 1 and 9 were developed to represent a range of potential contingency situations at discrete points along the spectrum of conflict. Although these scenarios represent the types of situations we believe we must be prepared to face in the future, they were not the basis for the programs that produced our current capabilities; their details remain under study, and their implications are only now being incorporated into the Future Years Defense Program. Thus, this assessment represents a first report of the transition from planning and programming for global war with the Soviet Union to planning and programming for the situations we expect to face in the 1990s. As a result, when current — or even some currently programmed — capabilities are compared to the assessments of the specific scenarios described here, deficiencies are identified. The objective is to reduce or eliminate these deficiencies as the scenarios evolve and future programs are adjusted to their needs.

Figure 12-3 arrays the scenarios on the spectrum based on their probability of occurrence. In Figure 12-4, the scenarios are arrayed based on the consequence of the United States failing to meet its objectives. Generally, the two figures show that as the level of violence increases, the probability of occurrence decreases, and the consequence of failure increases.

Superimposing these two figures on one set of axes — as shown in Figure 12-5 on page 12-6 — allows us to visualize the area of most potential risk where the probability of occurrence and consequences of failure are relatively high. The Defense Program provides the force capability to meet requirements near the center of the two charts where risk is relatively high. The requirements of the lower end of the spectrum are largely subsumed by forces focused on higher intensity conflicts. The requirements at the upper end of the spectrum, where force structure has traditionally been focused, are less imperative because of lower probabilities of occurrence. At the same time, the global nuclear

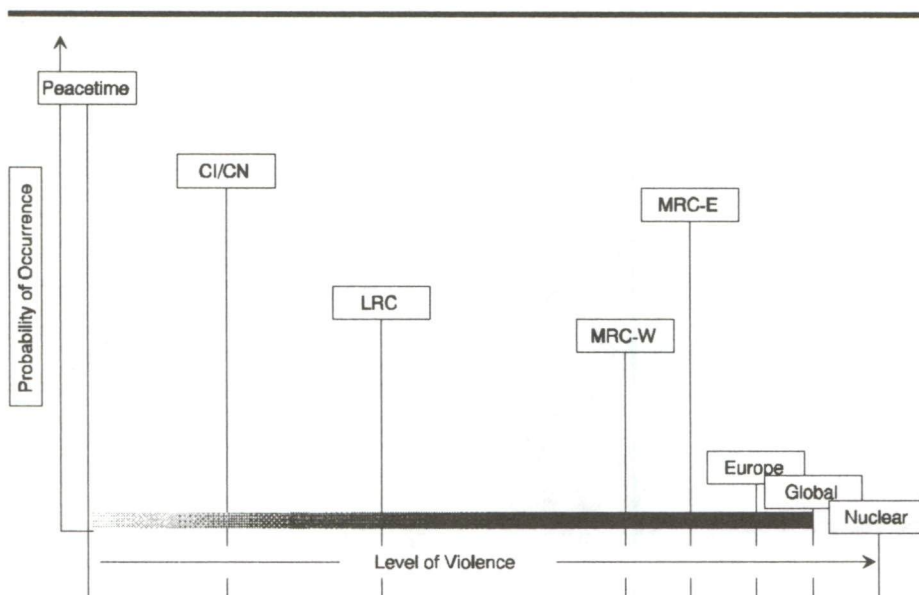


Figure 12-3. Probability of Occurrence

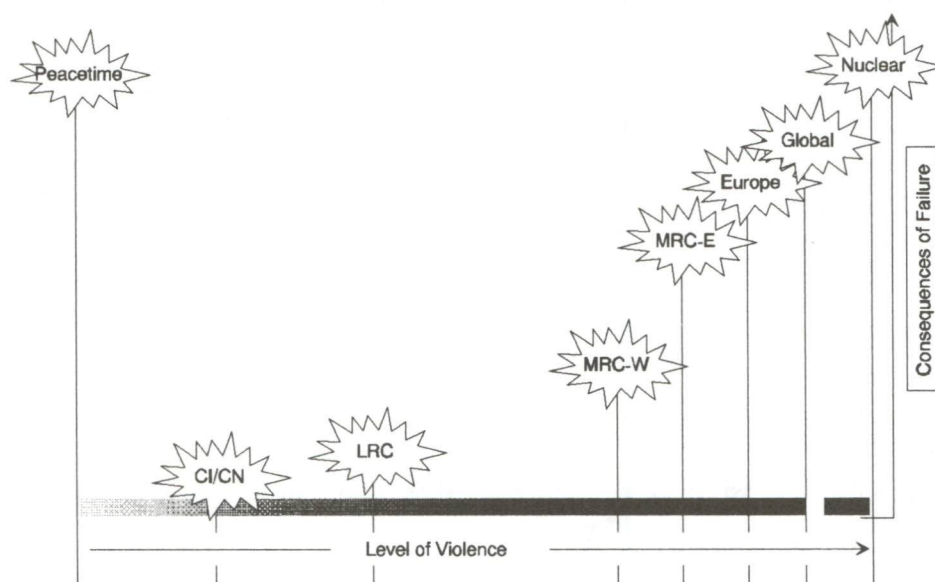


Figure 12-4. Consequences of Failure

war scenario at the far right is most compelling because of the catastrophic consequences of failure.

In summary form, the relationships of the various components of risk are compared against the range of scenarios used for analysis. The threat and warning time are specified by scenario, intensity of conflict is derived from the threat, likelihood of occurrence is based on trends in the strategic environment, and the consequence of failure is a judgment of implications of not meeting US objectives. Additional aspects of this assessment are as follows.

Assessment

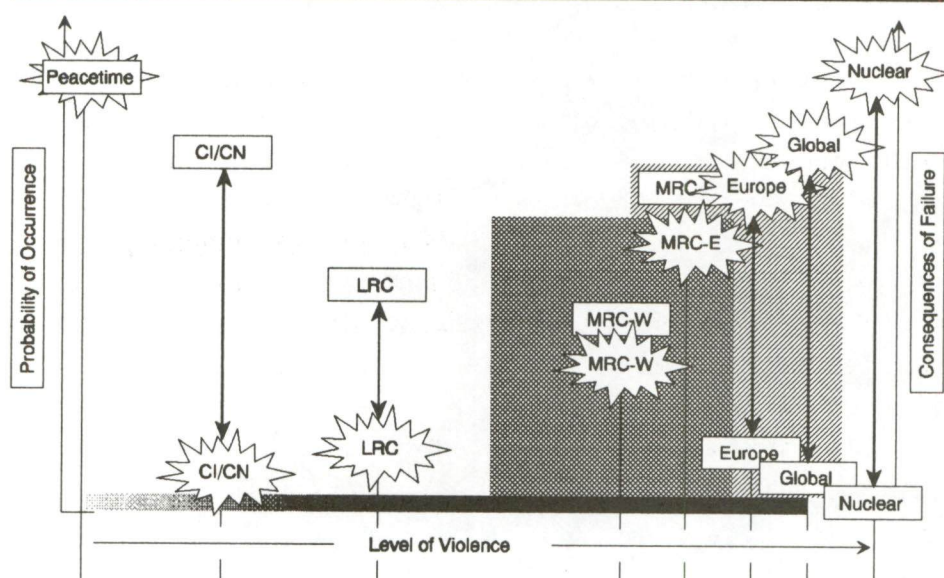


Figure 12-5. Probability of Occurrence and Consequences of Failure

Mobilization. Reserve forces are required in one degree or another in all contingencies. The principal requirement is for additional strategic airlift crews; this requirement generally has been met with volunteers. Preliminary analysis of Operation DESERT SHIELD reveals the need for some adjustments to emergency action procedures. This net assessment, while validating the Total Force Policy, concludes that the responsibility to respond initially to contingencies with combat forces rests with AC units.

Deployment. Generally, the Defense Program provides minimally sufficient strategic lift. Strategic lift will become more critical as forces are withdrawn from forward-deployment locations and sealift declines. Risk in deployment shortfalls could be reduced by increased amounts of pre-positioned equipment (either ashore or afloat) or by obtaining additional lift assets.

Employment. Excluding all other factors, US forces are capable of defeating the threats postulated in each of the assessment scenarios. However, shortfalls in other elements of capability reduce the fighting effectiveness of the force. The requirements for a quick deployment to a rapidly developing crisis put a strain on insufficient US lift capability. Our ability to sustain forces in combat at the higher end of the spectrum of conflict will degrade combat capability.

Sustainment. The United States has deficiencies in sustainment. Sustainment shortages include preferred munitions, bulk petroleum storage and distribution, selected secondary end-items, PWRS, CW defense equipment, and aviation maintenance items.

Force Generation Potential

The risk of failure in this area is moderate and increasing. Vulnerabilities already exist or are emerging in the industrial base, to include over-reliance on foreign sourcing, projected closings of critical defense production lines, and obsolescence of defense facilities. By the end of FY 1997, it is estimated it would take from 2 to 4 years to restore capacity to FY 1990 levels of production. Additional vulnerabilities are emerging because of reliance on increasingly scarce resources and the declining capability to apply innovative technologies. We consider these vulnerabilities significant; at the same time, longer warning times, the reduced Soviet threat, and a lower potential for conflict keep the associated risk in the moderate range. Should any of our fundamental assumptions change, risk could escalate rapidly and the ability to meet our fundamental objectives would be in jeopardy.

CONCLUSIONS

Given the transitional nature of the strategic environment, the forecast trends, and the assessed risks, the Defense Program provides minimum capability to accomplish national security objectives. Vulnerabilities in the current force structure, declining investment patterns, and the forecast of dramatically reduced funding and force structure result in an overall assessment of moderately high, but acceptable, risk. However:

- ❑ We are rapidly approaching the point where, if capability is reduced further, the United States will have to fundamentally alter its position in the world order and redefine its objectives and policies.
- ❑ The continued erosion of defense capability, left unchecked, will undermine the foundations of the US force structure and preclude the fostering of US interests.

We are moving rapidly toward unacceptable risk. How quickly we arrive will depend on how much of the Defense Program goes underfunded.

Assessment

Glossary

— A —

ABM	antiballistic missile
AC	active component
ACR	armored cavalry regiment
ADI	Air Defense Initiative
ADP	automated data processing
AFQT	Armed Forces Qualification Test
ALCM	air-launched cruise missile
ANG	Air National Guard
AOR	area of responsibility
APF	Afloat Pre-positioning Force
ARF	Air Reserve Forces
ARG	Amphibious Readiness Group
ARNG	Army National Guard
ARPS	Army Readiness Package – South
ASAT	antisatellite
ASM	air-to-surface missile
ASW	antisubmarine warfare
AWACS	Airborne Warning and Control System

— B —

BA	budget authority
BW	biological warfare; biological weapon

— C —

C ³	command, control, and communications
C ³ I	C ³ and intelligence
CA	civil affairs
CBW	chemical and biological warfare
CFE	Conventional Forces in Europe
CI	counterinsurgency; counterintelligence
CINC	commander-in-chief; commander of a unified or specified command
CINCMAC	Commander-in-Chief, Military Airlift Command
CJCS	Chairman, Joint Chiefs of Staff
CN	counternarcotics
CONUS	continental United States
CRAF	Civil Reserve Airlift Fleet
CS	combat support
CSBM	confidence and security-building measure
CSCE	Conference on Security and Cooperation in Europe
CSS	combat service support

Glossary

CTB Comprehensive Test Ban
 CVBG aircraft carrier battlegroup
 CW chemical warfare; chemical weapon

— D —

DCA dual-capable aircraft
 DG Defense Guidance
 DIA Defense Intelligence Agency
 DLA Defense Logistics Agency
 DOC Department of Commerce
 DOD Department of Defense
 DPRK Democratic Peoples' Republic of Korea (North Korea)

— E —

ECCM electronic counter-countermeasures
 ECM electronic countermeasures
 EHF extremely high-frequency
 ESM electronic support measures
 EUSC effective US control
 EW electronic warfare

— F —

FORSCOM Forces Command
 FSS fast sealift ship
 FY fiscal year
 FYDP Future Years Defense Program

— G —

GMR Graduated Mobilization Response
 GPS global positioning system

— H —

HNS host-nation support

— I —

ICBM intercontinental ballistic missile
 INF Intermediate-Range Nuclear Forces
 ING Inactive National Guard
 IRR Individual Ready Reserve

— J —

JMNA Joint Military Net Assessment

— L —

LOC line of communication
 LOTS Logistics Over-the-Shore
 LRC Lesser Regional Contingency (scenario)
 LTBT Limited Test Ban Treaty

— M —

MAC Military Airlift Command

MAGTF	Marine Air-Ground Task Force	NLT	no later than
MARAD	US Maritime Administration	NORAD	North American Aerospace Defense Command
MEB	Marine Expeditionary Brigade	NSNF	nonstrategic nuclear forces
MEF	Marine Expeditionary Force	- O -	
MEU(SOC)	Marine Expeditionary Unit (special operations-capable)	O&M	operations and maintenance
MILSATCOM	military satellite communications	O&S	operations and support
MILSPEC	military specification	OPLAN	operational plan
MOS	military occupational specialty	OPTEMPO	operational tempo
MPF	maritime pre-positioned force	- P -	
MPS	maritime pre-positioned squadron	PAX	passengers
MRC-E	Major Regional Contingency-East (scenario)	PB	President's Budget
MRC-W	Major Regional Contingency-West (scenario)	POL	petroleum, oils, and lubricants
MSC	Military Sealift Command	POMCUS	pre-positioned organizational materiel configured in unit sets
MTM/D	million ton-miles per day	PPP	pre-positioned procurement package
- N -		PREPO	pre-positioned
NALMEB	Norway Air-Landed MEB	PSYOPS	psychological operations
NAPCAP	NATO Allied Pre-committed Civil Aviation Program	PWRS	pre-positioned war reserve stocks
NATO	North Atlantic Treaty Organization	- R -	
NCA	National Command Authorities	R&D	research and development
NDRF	National Defense Reserve Fleet	RC	Reserve component
		RDT&E	research, development, test, and evaluation
		REC	Radio-Electronic Combat (Soviet)
		ROK	Republic of Korea (South Korea)

Glossary

RPV	remotely piloted vehicle
RRF	Ready Reserve Force

— S —

S&T	science and technology
SAC	Strategic Air Command
SAM	surface-to-air missile
SATCOM	satellite communications
SBWAS	Space-based Wide Area Surveillance
SDI	Strategic Defense Initiative
SECDEF	Secretary of Defense
SECNAV	Secretary of the Navy
SECTRANS	Secretary of Transportation
SELRES	Selected Reserve
SLBM	submarine-launched ballistic missile
SLCM	sea-launched cruise missile
SNF	short-range nuclear forces
SOF	special operations forces
SORTS	Status of Readiness and Training System
SPETSNAZ	Soviet special operations forces
SRP	Sealift Readiness Program
SSBN	nuclear-powered fleet ballistic missile submarine
SSM	surface-to-surface missile
SSN	nuclear-powered attack submarine

STON	short ton
START	Strategic Arms Reduction Talks
SWA	Southwest Asia

— T —

TBM	tactical ballistic missile
TFW	tactical fighter wing
TOA	total obligation authority
TW&AA	tactical warning and attack assessment

— U —

UE	unit equipment
UN	United Nations
USAFR	US Air Force Reserve
USAR	US Army Reserve
USC	US Code
USCENTCOM	US Central Command
USCGR	US Coast Guard Reserve
USCINCSpace	Commander-in-Chief, US Space Command
USEUCOM	US European Command
USLANTCOM	US Atlantic Command
USMCR	US Marine Corps Reserve
USNR	US Navy Reserve
USPACOM	US Pacific Command
USSOCOM	US Special Operations Command
USSOUTHCOM	US Southern Command

— W —

WRS	war reserve stocks
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