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DEVELOPMENT AND ACQUISITION(U) DEPARTMENT OF DEFENSE
WASHINGTON DC 1985

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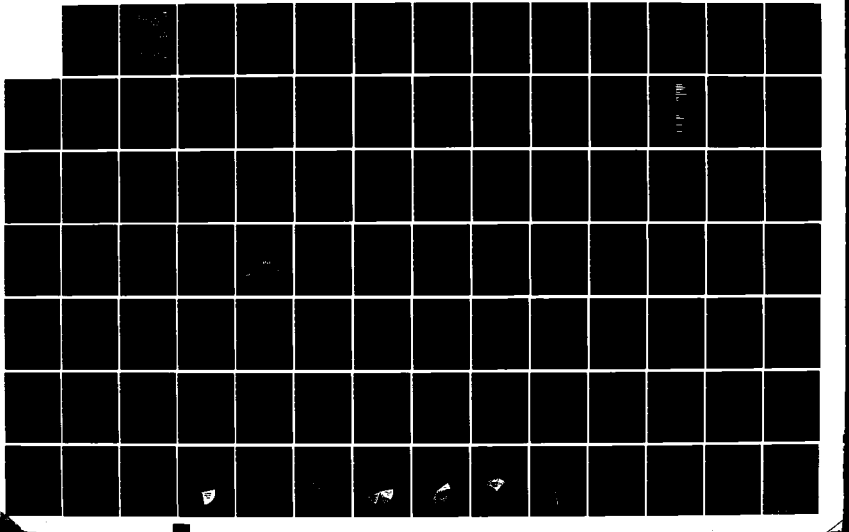
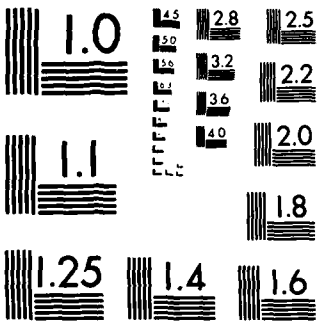
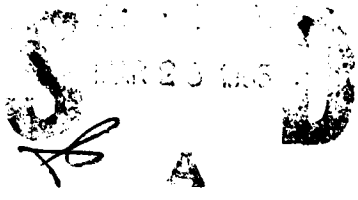




The FY 1986 Department of Defense Program for Research, Development and Acquisition

Statement by the Under Secretary of Defense, Research and Engineering, to the 99th Congress First Session, 1985



Data and figures contained herein are obtained from a variety of sources and several different methods are used for presentation. Questions should be forwarded to the Office of the Under Secretary of Defense, Research and Engineering, ATTN; Special Assistant for Assessment, Room 3D-1020, The Pentagon, Washington, D. C. 20301-3140.

The FY 1986 Department of Defense Program for Research, Development and Acquisition

Statement by the Under Secretary of Defense, Research and Engineering, to the 99th Congress First Session, 1985

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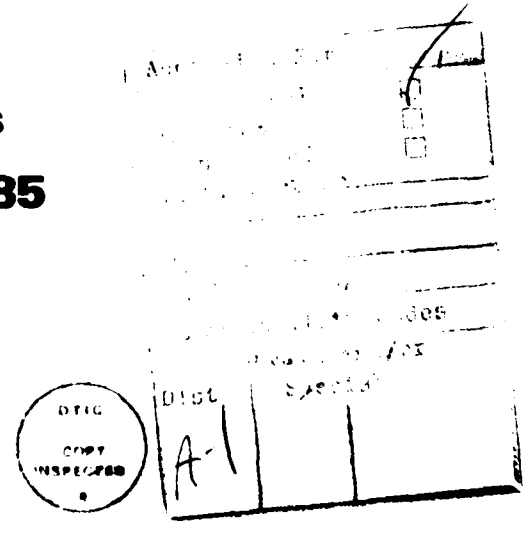

The FY 1986 Department of Defense Program for Research, Development and Acquisition

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I. INTRODUCTION AND OVERVIEW

THE FY 1986 RD&A PROGRAM

Introduction

The FY 1986 budget request for research, development and acquisition is aimed at sustaining this Administration's four-year effort to strengthen national security by turning management and technological accomplishments into real force modernization achievements. Four years ago, we recognized and accepted the challenge of rebuilding America's defenses. Our capability to deter aggression in the future was jeopardized by obsolescent equipment and facilities, and an aging inventory of weapons and weapon systems. Serious deficiencies included dangerously low stocks of ammunition and spare parts, which impacted our readiness to carry out national policies.

Today, our defenses are more ready and better equipped for sustained combat, and we are better able to deter aggression. We are also maintaining the technological edge needed to achieve the combat effectiveness which can somewhat offset the numerical superiority of the Soviet Union's forces and those of its clients and surrogates.

Much of this progress has been achieved because of substantial reforms in DoD acquisition policy which could not have been implemented without the endorsement of the Congress. We are therefore seeking not only your support of the FY 1986 RD&A budget request of $146 billion, but your continued help in achieving the affordability and responsiveness benefits of these reforms.

Program Basis

National security policy emphasizes deterrence of aggression and requires decisive means to counter threats to the interests of the U.S. and our allies throughout the complex and changing world. In developing the FY 1986 RD&A program, we assessed four dominant factors in the context of this policy. These factors are:

- The need to sustain the rebuilding effort initiated four years ago and thereby increase deterrence, reinforce our coalition defenses and increase the likelihood of peaceful relations among nations and negotiated arms reductions.
- The unrelenting efforts of the Soviet Union to upgrade their deployed military technology, to expand their mission capabilities far beyond any reasonable requirements for homeland defense, and to exacerbate political instabilities worldwide.
- The number, variety and complexity of on-going and potential low-intensity conflicts, which must be dealt with decisively and swiftly to minimize the risks of escalation and to discourage terrorism.
- The need to provide future options for addressing existing mission needs and alternative approaches for meeting national security requirements, and to anticipate future threats.

Associated with any executable program which addresses these factors are a set of risks. The projects and acquisition

efforts embodied in the FY 1986 RD&A budget request are the result of a comprehensive and in-depth planning and programming effort to balance these risks. One dimension of this balancing effort addresses our needs for readiness, sustainability and force structure together with our needs for modernization. Another dimension reflects the fact that we do not structure our peacetime forces to achieve a stand-alone capability to meet the direct and indirect threats of Soviet aggression, and the request therefore addresses the needs to assure alliance cohesion and the capability of our forces to operate effectively both jointly and in combination with the forces of our allies. Ultimately, however, development of the DoD RD&A program entails a balance of risks across the spectrum of conflict and of the priorities assigned to the forces--strategic, theater, maritime, rapidly deployable and special operations--which exist to mitigate these risks.

To cope with these formidable challenges, this Administration has accomplished, and has underway, substantial changes in the planning, programmatic, and acquisition decision processes. These changes have sharpened our perception of the needs of the force commanders and of the special problems of each region and mission area. We have also taken steps to strengthen the defense industrial base in its capability to produce the materiel, equipment and systems we need at affordable costs; to enhance responsiveness of the industrial base in crisis and conflict situations; and to encourage pre-planned product improvement and life-cycle extension techniques which can enhance readiness as well as affordability.

MODERNIZATION CHALLENGE

An integral element of the planning and programming process is assessment of near-term and future risks, with the aim of choosing an investment strategy which keeps these risks in balance and at an acceptable level. Such an assessment must take into account the threats being posed by the Soviet Union and its Warsaw Pact allies, and the Third World nations and entities that serve as extensions of or surrogates for Soviet military power. This assessment also calls for delineation of trends and directions of change in those threats. What follows is a brief summary of some major indicators used in the assessment; more detailed treatments are provided in later chapters.

Aggregate Measures

Soviet defense investment has been steadily increasing for many decades and has exceeded the annual U.S. defense investment since 1971. Also of note is that on 28 November 1984 the Supreme Soviet met and approved a 12% increase in Soviet military spending. While we do not believe the budget figures released by the Soviets even come close to reflecting what the Soviets spend on military forces, we do believe they are signaling an increase in their military spending.

As was noted last year, the estimated dollar cost of Soviet military RDT&E and procurement activities has exceeded our outlays for similar activities for more than a decade.

This situation is a consequence of steady real growth in Soviet RDT&E activities of about seven percent per year for the last two decades (doubling every ten

years), and is a compelling indicator of the Soviet commitment and priority for a strong military RDT&E program. The overall impact of the Soviet effort is that they are creating a number of future options for exploiting technological advances across a wide range of military missions, including options for new mission capabilities. This condition intensifies our need to assure both a sustained modernization effort and a strong defense technology base to assure an acceptable balance of near and long term risks to national security. Our prospects for achieving such a balance are enhanced in part by our strong commercial technology base, which has helped alleviate the asymmetry in expenditures for military research and development.

Production Balance

Production capability is crucial to development and execution of our overall investment strategy. The modernization competition between the free world and the Soviet Union involves factories as much as laboratories.

The challenge presented by the threat of the Warsaw Pact military industrial base and the growing Soviet military RDT&E program has several dimensions. First, the Soviet military acquisition effort is characterized by the highest national priority, centralized planning and multi-year resource allocation process, and long range stability. High production rates and routine use of evolutionary approaches for improving systems in parallel with the development of new systems are also characteristic of the effort and provide steadily improving military capability. Coordination of the Warsaw Pact efforts also entail far less negotiation than for the NATO alliance.

However, weaknesses of the Soviet acquisition program stem from three inter-related factors: the Soviets are constrained from taking advantage of the competitive processes and commercial incentives available to free-enterprise economies; they depend frequently on free-world accomplishments to point the way for high-technology advances; and their priorities and penchant for secrecy hinder application of scientific advances resulting in a relatively weak civil technology base.

The Soviet and Warsaw Pact (WP) production base provides a flow of equipment, weapon systems and munitions which is enormous, and has enabled them to supply modern weapons in substantial quantities to many Third World nations as well as sustaining an impressive modernization effort for their own forces and supporting their combat operations in Afghanistan. Table I-1 compares 1984 NATO/WP production of general purpose force systems and weapons. In the category of land combat the Warsaw Pact production figures substantially exceed those of NATO. These are estimates of current production only and are representative of present industrial activity. They do not represent total capacity which is higher.

This production differential permits the USSR to export major quantities of some systems to the Third World and still add new production to the Warsaw Pact forces at a rate greater than NATO's total production. For example, in the Land Combat category, the Warsaw Pact produced almost 13,000 tanks, other armored vehicles and artillery pieces in 1984. The rate of delivery of items in this

Table I-1. COMPARISON OF NATO AND WARSAW PACT MAJOR TACTICAL WEAPONS PRODUCTION IN 1984*

CATEGORY	NATO			WP		
	For Own Forces	Other	Total Production	For Own Forces	Other	Total Production
LAND COMBAT						
Tanks	1520	50	1570	3300	450	3750
Other Armored Vehicles	2300	1000	3300	4575	425	5000
Field Artillery	460	440	900	3850	200	4050
TACTICAL AIR						
Fixed Wing**	640	235	875	690	385	1075
Helicopters	495	205	700	650	150	800
MARITIME FORCES						
Major Surface Combatants	17	6	23	10	2	12
Amphibious Ships	0	2	2	1	0	1
Attack Submarines	8	3	11	6	0	[illegible]

*Includes exports.
**Includes all Interceptors.

tegory to the Third World has remained gh. Despite this, the Warsaw Pact tained an estimated addition to their rces of almost 12,000 systems, which bstantially exceeds NATO's total oduction of about 6,000 units.

Technology

Modernization involves providing ıproved weapon systems that can nction in an effective manner in future mbat environments. The foundation for is is the Science and Technology (S&T) ogram. The S&T program is the source knowledge and technology that create e system options for the future.

We are now fielding systems using chnologies developed during the 1960s. e must now provide the technology foundation for those weapon systems that will be needed in the 1990s and the next century. To this end, DoD conducts a strong and viable S&T program ranging from long-term basic research efforts to large feasibility demonstrations. It is our goal that this program will provide the systems needed by future commanders to accomplish their military missions.

As reported elsewhere in this statement, the Soviets are maintaining a large and aggressive military R&D program. The products of their effort are of concern to this country. The S&T program, in addition to providing us weapons options, prevents our forces from being surprised by technological innovations and enables us to react quickly when necessary. Our S&T goals, S&T options and the prevention of technological

urprise, are important ingredients of the verall modernization program.

Industrial Base

The defense industrial base provides he means for meeting our alliance ommitments in times of crisis and onflict. This industrial base derives its trength from the competitive economic nvironment of the free-world, and our eadership position must be sustained. 'hat strength must be increased by aintaining affordability and anufacturing technology initiatives, and chieving surge capabilities for selected ission-oriented programs to complement tockpiling. DoD investments in anufacturing technology not only enerate cost savings, but also contribute o a stronger sustainability because we are reating a stronger industrial base with educed production lead times.

RGANIZATION AND MANAGEMENT

This Administration has taken steps o assure that our defense acquisition ystem is strengthened and that its fficiency, responsiveness and productivity re improved.

Organizational Changes

Over the past four years, we have evised the planning process and the ecision-making structure for imple- enting the results of that process. We ave an integrated management structure r addressing key dimensions of the D&A process: weapon systems equisition, the technology base, and force anagement and support capabilities. Recently a reorganization has been announced which will further streamline the management of acquisition, logistics, and command, control, communications and intelligence (C^3I). An Assistant Secretary of Defense for Acquisition and Logistics will be established. This will bring under a single executive the responsibility for managing weapons system procurement along with supporting facilities, systems and other physical resources. The responsibilities of the Assistant Secretary of Defense (C^3I) will be broadened by combining C^3I policy and resources under one office. Both of these ASD's will report directly to the Secretary of Defense.

In parallel, the DoD has improved, through procedural changes, the annual program review. The review has been strengthened in terms of Service involvement, and procedures have been implemented to assure that an adequate perspective of senior military commanders' needs and concerns are available during both the planning and programming phases of the acquisition process.

The concerns of the Congress regarding needs to reinforce our operational test and evaluation capabilities have been addressed by the establishment of an independent directorate reporting to the Secretary of Defense. By serving as a member of the Defense Resources Board, the Director of Operational Test and Evaluation brings to the decision-making process a perspective on the readiness of new developments for operational use.

A Joint Tactical Command, Control and Communications Agency (JTC^3A) has been established to integrate architectural

Table II-4. MAJOR STRATEGIC MODERNIZATION EFFORTS (concluded)

U.S.		USSR	
Mission Area/System	**Qualitative Trends**	**Mission Area/System**	**Qualitative Trends**
TRATEGIC DEFENSIVE SYSTEMS			
allistic Missile Early Warning System (BMEWS) AVE PAWS Ballistic Missile Warning System	• Improved early warning • Continental coverage for warning of SLBM attack	Modified GALOSH ABM High-Acceleration Missile Krasnoyarsk and Pushkino Very Large Radars MiG-31 (FOXHOUND) Air-to-Air Missile, AA-9	• Two-layer ABM defense • Improved potential for nationwide ABM capability • Improved capability to engage low altitude aircraft and cruise missiles • Provides look down/shoot down capability
)ver-the-Horizon Radar (OTH-B)	• Long range, all-altitude surveillance • Flexible capability to address future threats	IL-76 (MAINSTAY) AWACS	• Improved capability to detect and identify low altitude aircraft and cruise missiles
		SA-10 Surface-to-Air (SAM) System Modification	• Mobility for increased survivability
-15/Anti-Satellite System	• Responsive to low altitude Soviet satellite • Launch flexibility		
NON-STRATEGIC NUCLEAR SYSTEMS			
?ERSHING II Tactical Ballistic Missile	• Rapid response for time urgent targets • High mission flexibility and survivability • High accuracy permits reduced warhead yields and lower collateral damage	Improved SS-20 IRBM SS-12, Mod 2; SS-21; SS-23; Tactical Ballistic Missiles	• Accuracy improvements leading to possible conventional and chemical application • Improved accuracy and range
Ground Launched Cruise Missile (GLCM)	• Increases theater firepower • Increases survivability of theater nuclear force • Low altitude, low radar cross section and small infrared signature	SS-CX-4 Ground Launched Cruise Missile (GLCM) Large GLCM Development SS-NX-21 SLCM	• New peripheral attack capabilities, eventual accuracy improvements for non-nuclear applications

w shorter-range ballistic missile velopments. While these are presumed replace older systems for nuclear attack peripheral targets, they also possess fficient accuracy for delivery of nventional munitions and chemical ents against point tactical targets (e.g., posing air defense and C^3 facilities).

SOVIET ACQUISITION OF WESTERN TECHNOLOGY

For more than two decades, the Soviet Union has maintained a massive national-level program for acquiring critical military-related Western technology. This effort is large and well organized, and in effect provides the Soviet Union some of

Table II-4. MAJOR STRATEGIC MODERNIZATION EFFORTS

U.S.		USSR	
Mission Area/System	**Qualitative Trends**	**Mission Area/System**	**Qualitative Trends**
RATEGIC OFFENSIVE SYSTEMS			
ACEKEEPER ICBM	• Hard target capability • Increased throw weight • Improved ICBM effectiveness	SS-X-24 ICBM (Peacekeeper Class) SS-X-25 ICBM Improved Liquid Propellant ICBM's	• Transition to solid propellant boosters • Mobility for survivability • Improved accuracy
IDENT SSBN	• Improved quieting for reduced detectability • Improved defensive systems • Increased firepower	TYPHOON SSBN	• Capability to operate under Polar ice cap
IDENT II (D-5) SLBM	• Hard target capability • Targeting flexibility/ coverage	Improved SS-N-20 SLBM SS-NX-23 SLBM Improved SS-NX-23 SLBM	• Enhanced firepower, target coverage
1B Bomber	• Improved penetration capability, base escape • Increased firepower • Enhanced flexibility for a variety of bomber missions	BLACKJACK Bomber	• Increased firepower, capability and flexibility for strategic bomber force
52 Air Launched Cruise Missile (ALCM) hort Range Attack Missile SRAM II)	• Assured penetration by diluting and stressing enemy air defenses • Improved accuracy and survivability • Greater warhead flexibility	BEAR H/AS-15 Air Launched Cruise Missile (ALCM)	• Provides standoff capability for strategic bomber force
ea Launched Cruise Missile (SLCM)	• High mission flexibility (land attack/anti-ship) • High survivability/ penetrability	Modified YANKEE Cruise Missile Submarine Large Sea Launched Cruise Missile (SLCM) SS-NX-24	• Adds a new dimension to the strategic nuclear threat
xtremely Low Frequency ELF) Submarine Communications System	• Improved connectivity to submarine forces	Extremely Low Frequency (ELF) Submarine Communications System	• Improved connectivity to submarine forces

s not intended that these tables be all lusive. Their purpose is to provide a l for the types of major weapon dernization efforts being conducted by U.S. and USSR. The Soviet list notes a capability for undertaking new tiatives as well as for following the U.S. l free world lead. Thus, while a number he activities listed can be traced to U.S. nterparts, a comparable number are dently Soviet initiatives, with no evolutionary basis or other linkage to free-world developments.

Noteworthy among the Soviet items listed in these tables are those that have dual applications for tactical and strategic missions. These include, for example, the SU-27 and MiG-29 fighter aircraft for tactical counterair and strategic air defense, and the SA-X-12 surface-to-air missile system with potential ballistic missile defense capabilities. Note also the

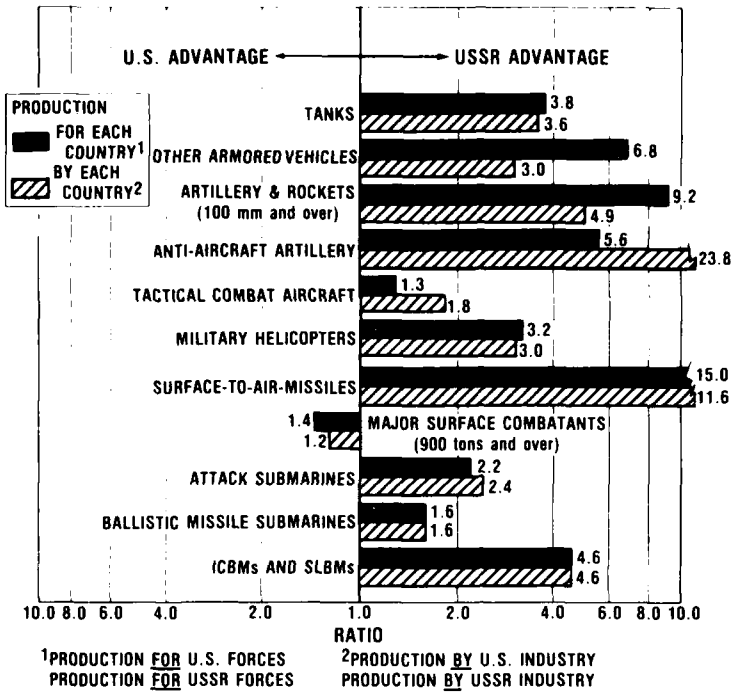


Figure II-2. AVERAGE ANNUAL PRODUCTION RATIOS OF SELECTED WEAPONS: USSR AND U.S., 1980-1984

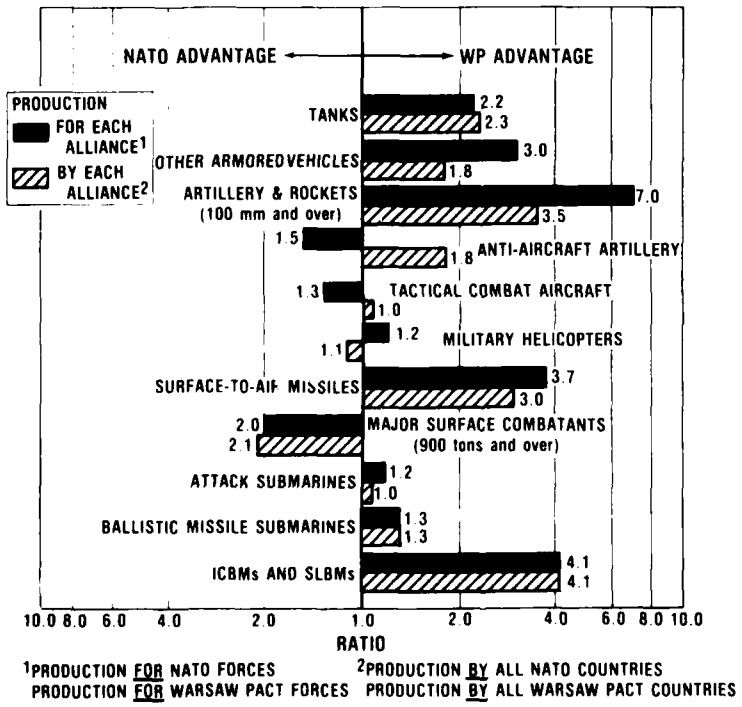


Figure II-3. AVERAGE ANNUAL PRODUCTION RATIOS OF SELECTED WEAPONS: WP AND NATO, 1980-1984

ıperiority. The table shows, in ;gregate, roughly the same level of :ployed technology in strategic and land rces, with the U.S. superior in air, naval ıd C3I deployed technology level. owever, the indicated shifts in the ›viets favor are a matter of concern.

In sum, with the exception of a few ·eas, the Soviet Union is not now a leader ı science and technology. But, when ımbers of modern systems are factored ı, their deployed forces are equal or ıperior in many more areas than a ·stem by system technology comparison ıows.

UTPUT OF MILITARY ACQUISITION

Measured in terms of new weapon ·stems and major modifications reaching ›erational capability each year, the SSR introduces slightly more than the .S. (see Figure II-1). However, the USSR ıtroduces more minor modifications than ıe U.S. consistent with its emphasis on ıutine use of evolutionary improvements ı parallel with the development of new ·stems.

Comparisons of annual production ıtios of major classes of weapons are ıown in Figures II-2 and II-3. These gures summarize the average production ıtios for the last five years. The black bar ves the ratio of weapons produced for ıch country or alliance from all sources, ıcluding imports. The striped bar gives ıe ratio of weapons produced by each ıuntry's or alliance's industry, including ıose exported. A comparison limited to ıly the U.S. and USSR shows a Soviet

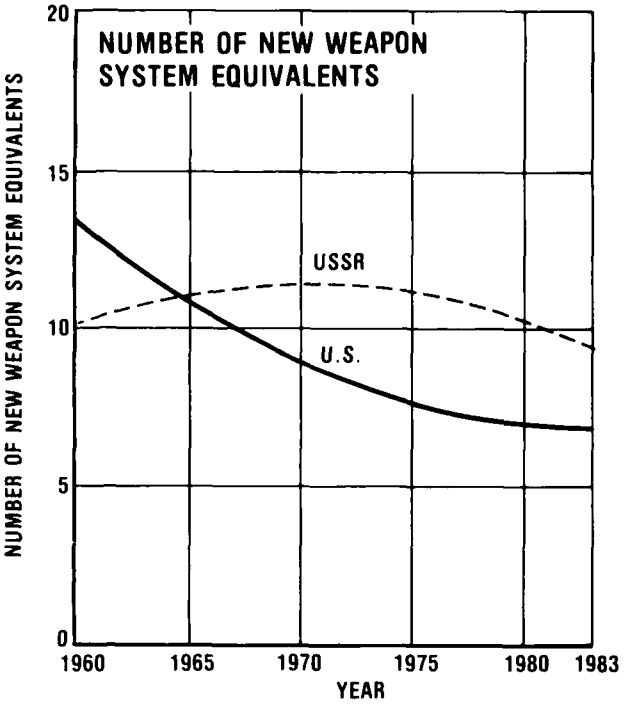


Figure II-1. TOTAL WEIGHTED NUMBER OF U.S. AND USSR WEAPON SYSTEMS INTRODUCED ANNUALLY

advantage in all areas except major surface combatants. Including our NATO allies in these production ratios reduces the difference to the point that NATO has an advantage in a few categories. However, a Warsaw Pact military advantage of more than two to one is shown in five classes, which is of continuing concern.

MAJOR MODERNIZATION EFFORTS

It is also necessary to examine the qualitative trends that are represented in the development and production of new weapon systems. Tables II-4 through II-6 summarize major Soviet and U.S. modernization activities and their implications for a number of mission areas.

Table II-3. RELATIVE U.S./USSR TECHNOLOGY LEVEL IN DEPLOYED MILITARY SYSTEMS

DEPLOYED SYSTEM	U.S. SUPERIOR	U.S./USSR EQUAL	USSR SUPERIOR
STRATEGIC			
INTERCONTINENTAL BALLISTIC MISSILE		X	
BALLISTIC MISSILE SUBMARINE	X		
SUBMARINE LAUNCHED BALLISTIC MISSILE	X →		
BOMBER	X		
SURFACE-TO-AIR MISSILE (SAM)			X
BALLISTIC MISSILE DEFENSE			X
ANTI-SATELLITE			← X
CRUISE MISSILE	X →		
TACTICAL			
LAND FORCES			
SAMs (Including Naval)		X	
TANKS		X	
ARTILLERY		X →	
INFANTRY COMBAT VEHICLES		X	
ANTI-TANK GUIDED MISSILES		X	
ATTACK HELICOPTERS (VTOL)	X		
CHEMICAL WARFARE			X
BALLISTIC MISSILES		X	
AIR FORCES			
FIGHTER/ATTACK AIRCRAFT	X →		
AIR-TO-AIR MISSILES	X		
AIR-TO-SURFACE MUNITIONS	X →		
AIRLIFT	X		
NAVAL FORCES			
ATTACK SUBMARINES	X →		
TORPEDOES	X →		
SEA BASED AIRCRAFT	X		
SURFACE COMBATANTS	X →		
NAVAL CRUISE MISSILE		X	
MINES			X
COMMAND, CONTROL, COMMUNICATIONS, AND INTELLIGENCE			
COMMUNICATIONS	X →		
ELECTRONIC COUNTERMEASURES/ECCM	X		
EARLY WARNING (Includes Surveillance & Reconnaissance)	X		
TRAINING SIMULATORS	X		

*1. These are comparisons of system technology level only, and are not necessarily a measure of effectiveness. The comparisons are not dependent on scenario, tactics, quantity, training or other operational factors. Systems farther than 1 year from IOC are not considered.
2. The arrows denote that the relative technology level is changing significantly in the direction indicated.
3. Relative comparisons of technology levels shown depict gross standing only; countries may be superior, equal or inferior in subcategories of a given technology in a deployed military system.
4. The judgments represent consensus within each area.

Table II-2. RELATIVE U.S./USSR STANDING IN THE TWENTY MOST IMPORTANT BASIC TECHNOLOGY AREAS

BASIC TECHNOLOGIES	U.S. SUPERIOR	U.S./USSR EQUAL	USSR SUPERIOR
1. AERODYNAMICS/FLUID DYNAMICS		X	
2. COMPUTERS AND SOFTWARE	← X		
3. CONVENTIONAL WARHEAD (Including all Chemical Explosives)		X	
4. DIRECTED ENERGY (Laser)		X	
5. ELECTRO-OPTICAL SENSOR (Including Infrared)	X		
6. GUIDANCE AND NAVIGATION	X →		
7. LIFE SCIENCES (Human Factors/ Biotechnology)	X		
8. MATERIALS (Lightweight, High Strength, High Temperature)	X →		
9. MICRO-ELECTRONIC MATERIALS AND INTEGRATED CIRCUIT MANUFACTURING	X		
10. NUCLEAR WARHEAD		X	
11. OPTICS	X →		
12. POWER SOURCES (Mobile) (Includes Energy Storage)		X	
13. PRODUCTION/MANUFACTURING (Includes Automated Control)	X		
14. PROPULSION (Aerospace and Ground Vehicles)	X →		
15. RADAR SENSOR	X →		
16. ROBOTICS AND MACHINE INTELLIGENCE	X		
17. SIGNAL PROCESSING	X		
18. SIGNATURE REDUCTION (Stealth)	X		
19. SUBMARINE DETECTION	X →		
20. TELECOMMUNICATIONS (Includes Fiber Optics)	X		

*1. The list is limited to 20 technologies, which in aggregate were selected with the objective of providing a valid base for comparing overall U.S. and USSR basic technology. The list is in alphabetical order. These technologies are "on the shelf" and available for application. (The technologies are not intended to compare technology level in currently *deployed* military systems.)
2. The technologies selected have the potential for significantly *changing* the military capability in the next 10 to 20 years. The technologies are not static; they are improving or have the potential for significant improvements; new technologies may appear on future lists.
3. The arrows denote that the relative technology level is changing significantly in the direction indicated.
4. The judgments represent consensus within each basic technology area.

- Stable design organizations and teams considered to be state assets, and funded to maintain full employment;
- Multiyear planning and resource approval;
- Extreme secrecy;
- Aggressive exploitation of Western technology.

Although a large amount of technological innovation is not motivated by the Soviet system, the defense research program can be quite innovative if necessary. The Soviets have shown a tendency in recent years to undertake high risk, high gain research to seek breakthroughs in selected military technology. However efficient utilization of existing technology in system design tends to be their forte. A list of recent notable advances is shown in Table II-1.

Table II-1. SOVIET DESIGN/TECHNOLOGICAL INNOVATIONS

- Unmanned lunar rover
- Fractional orbital bombardment system
- Surface effect vehicles
- Spaceborne nuclear power systems
- Cold-launched ICBMs
- Antisatellite systems
- Large high-power lasers
- Magnetohydrodynamic power generation
- Titanium submarine hulls

TECHNOLOGY COMPARISONS

Despite Soviet emphasis on R&D, U.S. technological accomplishments considering both the military and private sectors continue to provide us a lead in most significant technical areas. However, it is important that the U.S. continue a large and vigorous military R&D program to preclude progressive erosion of our position in deployed technology relative to the Soviets.

Table II-2 compares the 20 basic technologies that have the greatest potential for significantly improving military capabilities in the next 10 to 20 years. This table indicates that the U.S. has maintained its lead in most of the basic technologies critical to defense, although the Soviets are eroding the lead in some of the basic technologies where the U.S. now leads.

It is essential that we maintain our technological lead in order to offset somewhat the great disparity in quantity of deployed equipment. Five areas in which the U.S. has an important advantage are:

- computers and software
- sensors
- signal processing
- telecommunications
- automated production

Table II-3 compares the technology level reflected in deployed weapon systems. It should be noted that these assessments are for the level of technology only, and do not measure overall force or weapon effectiveness which is highly dependent on other factors such as doctrine, tactics, training and numbers deployed. For example, although the U.S. and USSR are assessed as being technologically equal in most land force systems, the greater number deployed by the Soviets results in their having an overall military

bureaus have shown even greater growth. The best qualified Soviet scientists and engineers are selected for military research and development. This stable and growing work force allows continuing development on a full range of military programs over long periods of time, even over several decades. The Soviet R&D and acquisition process thereby progresses and the net result is a steady flow of new, increasingly capable military weapons systems.

SOVIET WEAPONS ACQUISITION (R&D AND PROCUREMENT) PROCESS

The Soviet weapons acquisition process is substantially different from that of the U.S. The primary performers of Soviet R&D are research institutes, design bureaus, and production associations. These activities are vertically organized, which has led to activities conducted by highly specialized independent entities often isolated from each other. Military R&D has risen to where it now accounts for about half of all R&D conducted in the USSR. This compares to the roughly 30 percent of all U.S. R&D which is military.

Design bureaus are assigned to the defense industrial ministries and are critically important for technical innovation and development in the Soviet Union. Organizationally located between the research community and the separate production organizations, the design bureaus are responsible for developing new equipment embodying the best available technology consistent with system requirements and production schedules. Features of this management approach include multiyear program funding, regular product improvement and early responsiveness to U.S. and NATO program developments. Only a small amount of basic research is performed by design bureaus.

Roughly 50 major system design bureaus are involved in the development of Soviet major weapons, space and support systems. Each Soviet organization has its own specialization(s) and continuously conducts development at the full employment level-of-effort the Soviets feel is needed to handle their long term military/space requirements. Programs are routinely initiated that keep design bureaus fully employed. U.S. contractors have more cyclical business and employment fluctuates accordingly, substantially dropping if they do not win major new contracts.

Major new Soviet systems or modernization programs take about 8-15 years to develop. This is about the same time it now takes in the U.S. The Soviets have maintained this development time despite often shifting the focus and specialities of their system designers in response to new requirements.

More than 200 major military development programs have been initiated by the 50 major Soviet design bureaus every 10 years for the past three decades. In simple terms Soviet military R&D and production reflect:

- Strong, almost rigid, central management;
- Priority over civil R&D and production;
- High emphasis on producibility and production schedules;
- Evolutionary improvements through emphasis on modification rather than totally new systems;

II. ACQUISITION BALANCE - MILITARY EQUIPMENT AND TECHNOLOGY

INTRODUCTION

Soviet military power is the primary military threat facing the United States today. The growth of that power represents the principal consideration in choosing the level of American defense investment. As part of the determination of our security needs we must examine the magnitude and nature of this threat. This statement includes a number of comparative measures of the trends in defense investment of the U.S./USSR and NATO/Warsaw Pact in programs to develop, produce and acquire military weapons.

Judgements about military adequacy are neither simple nor precise. In an effort to be comprehensible we display mostly simple, objective measures of the U.S./USSR and NATO/Warsaw Pact military acquisition programs such as production quantities and inventory value of weapon systems. Investment in and acquisition of modern weapons is a cornerstone of military strength, a major component of deterrence, and a significant leading indicator of the future military balance. However, the quality and quantity of weapons are important but not necessarily dominant. For example, the measures reported here do not include the economic and industrial bases; the strength and dependability of allies; the quality, training and morale of combat units; and the quality of command and leadership, all of which can be decisive.

The Soviet Union is surrounded by what it perceives as hostile states and potentially unreliable allies. The Soviet military is thus the principal instrument of domestic power as well as foreign policy and influence. This drives military planning and is the basis for a long history of buying large quantities of military weapons. For example it is estimated that even prior to World War II the Soviet Union had more tanks, artillery and military aircraft than the other European nations combined.

Soviet political leaders recognize the role played by technology in determining military capabilities. They therefore seek to attain and demonstrate military technological superiority over the West and have given this goal a very high priority for at least the past two decades. They have adopted the approach of acquiring Western technology as well as developing technology internally. The Soviets' commitment of resources to military procurement and research and development (R&D) has been enormous by any measure. They have steadily expanded their facilities and work force for military R&D programs. Despite such efforts the strengthening of the U.S. military R&D commitment will make it more difficult for the USSR to close existing technology gaps.

The Soviet leadership gives military R&D high funding priority, with investment growing at a rate of about 7 percent a year. Key aerospace design

The USSR has also gained a great deal of Western militarily-relevant technology through legal purchases. The Warsaw Pact has shown energy and imagination in obtaining critical dual-use technologies which Eastern officials assert will be used solely for civilian purposes but which, instead, have been used to enhance military capabilities. Legal purchases have contributed significantly to the military potential of Soviet air, ground, strategic, and naval forces. For this reason, the United States, along with its allies, have been attempting to close legal methods of transfer of militarily-significant technology to the Eastern Bloc over the last several years.

However we need to further strengthen safeguards for preventing Soviet acquisition and exploitation of our advanced Western technologies.

armaments cooperation a reality. A recent Defense Science Board study of industry-to-industry armaments cooperation found that cooperation is possible--much of the regional, industrial infrastructure is already in place--but clear, unambiguous and consistent government support for arms cooperation is essential.

The Emerging Technologies initiative, endorsed by all NATO ministers, demonstrates our determination to increase NATO's conventional defense capabilities through armaments cooperation. This initiative focuses on near-term efforts to field military equipment which would make a substantial difference in the ability of Alliance forces to repel an aggressor. A key feature of the Emerging Technologies initiative is that opportunities are provided for early entry into high-technology programs. The U.S. must share technology to make the Emerging Technologies initiative succeed, but the technology that is shared must be protected from compromise through strengthened safeguards.

We are actively pursuing cooperation with Japan and other allied and friendly nations on a bilateral basis. We are working to understand their and our needs in order to most efficiently use the resources of all. Last year an agreement was negotiated with Japan to facilitate the flow of their technology to the United States with the aim of utilizing it to meet our mutual broad-based defense mission needs. We also extended our agreement with Israel to assure continued cooperation in technology, test and acquisition.

Technology Transfer and Export Control

Technology exchange is inherent in cooperation, but controls are required to prevent Soviet gains which would negate the benefits of our cooperative efforts.

One of the Soviets' major weaknesses of the past has been their technology base, which has made it difficult for them to translate research results into high quality end items. To offset this deficiency, which has impeded their efforts to enhance their military power, the Soviets have devoted considerable financial and personnel resources to the legal and illegal acquisition of Western technology. They consider the acquisition of Western technology an effective approach for reducing the costs, risks and time involved in advancing their development and production capabilities as well as for fielding more sophisticated weapons systems.

Acquisition of the most needed and critical foreign technology is orchestrated at the highest levels of Soviet government and collection requirements are coordinated with the Soviet weapons development and production system. Numerous entities in the Soviet Union including the Soviet intelligence services (KGB and GRU) have the responsibility for collecting Western classified, unclassified export-controlled, uncontrolled and proprietary technology using overt as well as clandestine collection methods. Soviet Bloc efforts in this regard augment those of the USSR and have resulted in the Soviet Union obtaining key technology and hardware.

productivity in defense acquisition. The Ten Point Program is described in detail in Section III.

Production Initiatives

A major adjunct to our management program has been increased emphasis on production matters. The major source of acquisition risk, cost escalation, schedule slippage, and failures in service emanate from failure to execute an efficient transition from development to production. We have a concerted production management effort underway which is aimed at assuring our systems make an efficient transition between these phases while maintaining effective cost control, product quality and schedule.

Two production initiatives are in being. The first emphasizes developing a producible design during the engineering development phase. Production engineering and planning elements of work are now an integral part of the engineering design and test cycle. This integration of activities is requisite to obtaining an end item that meets its unit cost objectives as well as its functional performance requirements.

The second production initiative calls for application of fundamental engineering principles and disciplines to balance technical risks and establishes managerial techniques to assess and reduce production risks. Two new DoD directives have been issued to implement these initiatives, and a new DoD manual providing guidance on risk reduction will be published.

INTERNATIONAL COOPERATION AND TECHNOLOGY CONTROL

Armaments Cooperation

Our cooperative activities focus on NATO, but involve many other countries with whom we share security interests. Since the landmark year of 1957, in which initial agreement was achieved on NATO co-production programs, there have been over 200 activities in the form of bilateral and multilateral co-development, co-production, and licensed production projects; memoranda of understanding and family of weapons projects; dual production and industry-to-industry efforts; and outright weapons sales.

Many of these projects successfully achieved a measure of standardization and interoperability and an exchange and infusion of technology into weapons systems that has enhanced Alliance capabilities. But NATO's cooperative efforts to date have not produced that degree of weapons modernization and interoperability, equipment availability and combat readiness needed to offset the numerical superiority and increasing sophistication of the Warsaw Pact forces.

Armaments cooperation can enhance NATO's industrial base by advancing technology and high-technology skills of the labor force. It can also help members of the Alliance field force multipliers in a timely and efficient manner. This opportunity will provide tangible incentives for the Europeans to modernize their conventional force capabilities. We and the Europeans must act, to make

either questionably priced or over-priced. This initiative serves to encourage competition and other price-challenging activities mentioned earlier.

Joint Programs

A priority concern of the DoD and the Congress for several years has been to enhance effectiveness, economy, and efficiency in program and management activities involving more than one Service. This year's RD&A budget request reflects explicit actions by DoD to address these concerns by focusing on the stability and management of joint programs.

Making joint programs happen and succeed takes a concerted effort by both the DoD and the Congress. We need to initiate actions which enhance affordability as well as meeting interoperability requirements and improving logistical efficiency. The search for opportunities includes surveying multi-Service mission requirements for those which involve common functions or related threats; breaking down unnecessary differences in requirements or specifications which can inhibit best use of the technology base; and integrating requirements to get more economical production rates, enhancing opportunities for competitive acquisition, and developing a simplified training and logistical support base.

The Joint Chiefs of Staff have taken a significant initiative to achieve these goals. In response to a recommendation by the 1983 Defense Science Board Summer Study on Joint Service Acquisition Programs, the JCS established the Joint Requirements and Management Board (JRMB). The JRMB is charged with examining potential joint military requirements and recommending candidates for joint development and resolving Service requirement issues that may arise after joint programs are initiated.

Quality and Productivity

During the past four years, we have placed particular emphasis on repairing the programmatic effects of the period of neglect which preceded this Administration. Inventories for almost every major weapon system are up over projected totals from the prior Administration. At the same time, we have endeavored to put new programs into place which are necessary to meet the evolving Soviet threat. The B-1B bomber and the Strategic Defense Initiative are important examples.

We must now shift emphasis to insure that we protect the investments we have made and make certain they reach fruition in the most economical way possible. Greater emphasis will be placed on quality and productivity during the near-term in order to achieve our long-term requirements for reliability and cost-effectiveness. We are committed to improving the quality of the products we buy, and are taking the necessary management steps to do so.

Quality is a broad subject and requires a comprehensive approach to insure that it is achieved. As a result of our review of critical quality areas such as materials, capital, and human resources, we have integrated ongoing efforts with new initiatives into a ten point program called the Defense Industries Quality Excellence Program. This program will serve as the focus of our efforts to improve quality and

efforts and to ensure interoperability of C^3 systems needed to support joint and combined operations. This Agency subsumes the functions of the Joint Tactical Communications Office (TRI-TAC) and the Joint Interoperability of Tactical Command and Control Systems Program Office both of which were under the cognizance of the Department of the Army. These offices were disestablished.

Resource allocation for conventional munitions acquisition is a crucial element in balancing our efforts for improved readiness and sustainability. The importance of integrated planning for munitions acquisition was recognized by the establishment of a Munitions Council. The Council serves as a forum for the Joint Chiefs of Staff and senior members of the Services and the Office of the Secretary of Defense to assess options for attaining an effective and affordable mix of modern munitions in adequate quantities.

The aforementioned changes should contribute to a more efficient R&D process shortening the time it takes to field new systems and result in more cost effective procurement of end items as well as spare parts.

Management Initiatives

We have established the DoD Council on Integrity and Management Improvement. This is a team effort for implementing the Defense Acquisition Improvement Program (DAIP) announced by the Deputy Secretary of Defense in April of 1981. Currently the DAIP focuses on securing more leverage from our acquisition dollars by improving quality, improving program stability, emphasizing multiyear procurement, striving for economic production rates, budgeting realistically, encouraging competitive acquisition, improving support and strengthening the industrial base.

The multiyear procurement initiative is a keystone effort because it enhances other initiatives such as program stability, economic production rates, realistic budgeting, and strengthening the industrial base. Congress approved 32 of 50 programs proposed for multiyear procurement and we estimate the multiyear savings from these 32 programs to be $4.0 billion. Savings from previously budgeted multiyear programs reduced FY 1986 total obligational authority requirements by about $2.0 billion.

Multiyear procurement, however, has not solved the difficulties we have experienced with program instability. Reductions of over $100 billion below procurement projections since 1981 have required that many important programs continue to be stretched out to accommodate near-term budget constraints which causes increased unit costs.

Our acquisition initiatives on tailoring requirements documents, has resulted in systematic reviews of requirements, related drawings and specifications for new weapon systems. These reviews serve the purpose of challenging over-specified or otherwise uneconomical requirements, and thereby reduce cost. Management actions by the Services and the Defense Logistics Agency will extend this concept to the procurement of material required in support of deployed systems. These efforts will reinforce our Defense Standardization and Specification Program and support detailed engineering reviews of technical requirements for material identified as

Table II-5. MAJOR TACTICAL WARFARE MODERNIZATION EFFORTS

U.S.		USSR	
Mission Area/System	**Qualitative Trends**	**Mission Area/System**	**Qualitative Trends**
TACTICAL COUNTERAIR SYSTEMS			
Patriot Surface-to-Air Missile System	• Simultaneous engagements • Effective in intense ECM environments • Increased mobility • Multiple targets	SA-X-12 SAM System	• Capability to engage SRBMs as well as high-performance aircraft
Stinger Man Portable (SAM)	• Identification, Friend or Foe • All-Aspect target engagement • More maneuverable	ZSU-23-4 Follow-on Self-propelled Anti-Aircraft Artillery	• Improved mobility, lethality and accuracy
		SU-27 (FLANKER) MiG-29 (FULCRUM)	• Look-down/shoot-down fighters • Possible ground attack role • Dual strategic/tactical mission
Advanced Medium Range Air-to-Air Missile	• Multiple engagements against ECM	Air-to-Air Missile AA-10	• Advanced capabilities
CLOSE AIR SUPPORT AND CLOSE GROUND COMBAT SYSTEMS			
AH-64A Apache Attack Helicopter	• Improved speed and agility • Night and all weather capability • Target detection/designation capability • Advanced avionics and armament	Mi-26 (HALO) Helicopter Mi-28 (HAVOC) Helicopter	• Heavy payload, long range • Increased speed, agility, lift capability • Increased survivability
		New Helicopter	• Fighter helicopter with air-to-air capability (world's first)
AV-8B Harrier II V/STOL	• Vertical landing and takeoff close air support aircraft • Improved weapon accuracy	T-80 Tank	• Survivability versus chemical attack, nuclear effects • Enhanced firepower
Light Armored Vehicle (LAV-25) Multiple Launch Rocket System (MLRS)	• Lightweight, assault capable direct fire support weapon • Suppression of enemy artillery and air defense	152-mm gun	• Dual conventional/nuclear capability
HELLFIRE Air-to-Surface Missile Laser Maverick Air-to-Surface Missile	• Improved anti-armor capability • All weather close air support weapon	Millimeter-Wave Anti-Tank Guided Missile	• Improved capabilities
INTERDICTION AND DEFENSE SUPPRESSION SYSTEMS			
High Speed Anti-Radiation Missile (HARM) F/A-18 HORNET EF-111A Tactical Jamming Aircraft	• All weather missile to destroy enemy radars • Increased weapons load • Operational flexibility • Provides electronic countermeasures (ECM) protection to tactical aircraft	Electro-Optical Tactical ASM	• Increased target coverage • Precision weapon delivery

Table II-5. MAJOR TACTICAL WARFARE MODERNIZATION EFFORTS (concluded)

U.S.		USSR	
Mission Area/System	**Qualitative Trends**	**Mission Area/System**	**Qualitative Trends**
MARITIME SYSTEMS			
CG-47 Aegis Cruiser	• Quick reaction • High firepower • ECM immunity in AAW	Nuclear-Powered Aircraft Carrier	• Conventional Take-Off and Landing (CTOL) capability
DDG-51 Guided Missile Destroyer	• Quick reaction • Multi-mission guided missile destroyer • Operates offensively and defensively	SLAVA-class Guided Missile Cruiser (about 12,000 tons)	• Increased firepower
LSD-41 Landing Ship Dock	• Improved amphibious capability	New Naval SAM	• Improved Fleet Point Defense
LAMPS Mk III ASW System	• Expanded ASW Capability	Ka-27 (HELIX) ASW Helicopter	• Growing emphasis on sea-based airpower
ASW Stand-Off Weapon	• Provides submarines with effective ASW stand-off capability	MIKE-class Nuclear Attack Submarines (SSN)	• Increased size • ASW missile armament
		SIERRA-class SSN	• Submerged long-range stand-off
		SS-N-22 Surface-to-Surface Missile	• Increased speed and low altitude penetration
Rolling Air Frame Missile	• Cruise Missile defense for naval forces		
Mark 50 Torpedo	• Improved speed and endurance for enhanced capability	Torpedo	
MOBILITY SYSTEMS			
C-5B Transport	• Expanded force projection • Outsized cargo capability • Drive-on/Drive-off capability	IL-76 (CANDID) Tanker	• Improved in-flight refueling
		AN-72 (COALER) Transport	• Configuration similar to much larger US YC-14 Short Take-off and Landing (STOL) transport
		CONDOR Transport	• Comparable to C-5
C-17 Transport	• Provides expanded inter-theater and intra-theater airlift capability. Has out-sized cargo capability		

the results of Western investments in R&D. Soviet military decision-makers acquire such technology through a variety of mechanisms. It uses the Soviet KGB (Committee for State Security) and GRU (Chief Intelligence Directorate of the Soviet General Staff) espionage organizations; the facilities of the Ministry of Foreign Trade in Western countries, including state-owned business corporations; the Soviet State Committee on Science and Technology, which arranges government science and technology agreements; and the Academy of Science Institutes, which has contacts with Western universities and research institutes through technical conferences. These Soviet organizations also have the cooperation of their counterparts in other Soviet Bloc countries.

Successful acquisition of Western goods and technology by the Warsaw Pact makes the following contributions to Warsaw Pact military efforts:

- Saves billions of dollars;

Table II-6. MAJOR SPACE MODERNIZATION EFFORTS

U.S.		USSR	
Mission Area/System	**Qualitative Trends**	**Mission Area/System**	**Qualitative Trends**
SPACE SYSTEMS			
Space Shuttle	• Place DoD satellites in orbit • Use of Inertial Upper Stage (IUS) to place DoD payloads in high orbit	Space Shuttle	• Reusable space transportation system
		Medium-Lift Launch Vehicle	• Supports high launch rates
		Heavy-Lift Launch Vehicle	• Saturn - V class
		Space Plane Development	• Manned reconnaissance and observation
Navy Remote Ocean Sensing System	• Naval oceanographic satellite	GLONASS Navigation Satellite	• Worldwide precision navigation and positioning
Defense Satellite Communications System III (DSCS III)	• Improved jam resistance for command, control and early warning	Satellite Data Relay	• Worldwide near-real-time data transmission
Milstar Satellite Communications System	• Increase of communications capacity and survivability		
Navstar Global Positioning System	• Precision all weather navigational data		

- Reduces weapon systems development times;
- Enhances productivity of the defense industrial base;
- Reduces engineering risks in weapons acquisition;
- Allows more effective qualitative response and countermeasures to Western weapons and tactics.

We believe that Soviet/Warsaw Pact technology acquisitions from the West over the last 20 years have provided very important contributions to Soviet capabilities in all key mission areas (strategic warfare, tactical warfare, C3I, and defense-wide support).

As the Soviets pursue their aggressive technology acquisition program, the U.S. and its allies must work to curtail those transfers with significant adverse military impact. Our recent export control efforts have been successful in curtailing critical transfers; however, there will be continued efforts on the part of the Soviets to acquire specific technologies in the coming years. Given this fact, we must continue to place emphasis on restricting transfers, not only through the use of the Commodity Control List (CCL) and Coordinating Committee (COCOM) but also through other channels.

III. ACQUISITION MANAGEMENT

INTRODUCTION

In seeking to revitalize our nation's military strength, it was essential from the outset of this Administration to improve the acquisition process. The time required from concept formulation to production and deployment had increased significantly over prior decades. Program and unit costs were rising beyond acceptable limits. Important defense systems were not performing as intended, and, in many cases, reliability had become suspect. The message was self-evident. If we were to be successful in achieving our basic goal to rebuild America's military strength, priority attention had to be devoted to the manner in which we acquire military systems.

Consequently, our first order of business was to conduct a comprehensive review of the defense acquisition process and to identify the remedies necessary to reduce acquisition time and costs and to insure the timely availability and reliability of our weapon systems. In April 1981 the Deputy Secretary of Defense introduced 32 management initiatives which resulted from the joint review of the acquisition process conducted by the Office of the Secretary, the Joint Chiefs of Staff, the Services, and representatives of industry. Many of these initiatives have been implemented and fully integrated into the acquisition process during the past four years. Those initiatives which have not yet been fully implemented have been reemphasized, and now receive priority management attention as basic pillars of the Defense Acquisition Improvement Program (DAIP).

The spare parts procurement reforms introduced by the Secretary in July 1983 constitute a major area of acquisition management reform. As a result of initiatives to reduce the price of spare parts purchases, the Department has initiated a new approach which promises to avoid over pricing in the future. We are committed to full implementation of the Secretary's ten point program to reduce pricing abuse, and strongly support the Service programs and initiatives which are underway to provide cost-effective management of spare parts procurement.

In the long term, none of the acquisition reforms mentioned will endure unless America's defense industrial base remains strong. Industrial responsiveness has been designated by the Deputy Secretary as a matter of highest management priority. We have taken a number of important steps to insure that we achieve this underlying goal. Through programs such as the Industrial Modernization Incentives Program (IMIP), we continue to seek ways to improve the productivity of our defense industries. Renewed emphasis is being placed on quality assurance.

DEFENSE ACQUISITION IMPROVEMENT PROGRAM

As we approach the fourth anniversary of the DAIP, we take considerable pride in the progress we have made. The acquisition process itself has

undergone considerable simplification. The administrative burden has been reduced. Greater emphasis has been placed on ensuring proper support and reliability for our systems. Important steps have been taken to improve program affordability and stability through more effective cost-control mechanisms. The foundation for further improvements in the acquisition process has been laid.

Full implementation of the DAIP initiatives, however, is not completely within the control and authority of the Department. The successes which have been achieved thus far have often occurred because the Services and the Secretary have received support from other Executive Branch agencies, as well as from the Congress. Future progress in implementation depends heavily upon maintaining the basic consensus which exists and expanding support to wider areas of management emphasis. In particular, major progress in improving the affordability of our defense programs through increased program stability depends upon the cooperation between the Department and the Congress. Full budgetary support of our acquisition programs will enable us to avoid the costly stretchouts and program perturbations imposed during the past three years.

Simplifying the Process

The basis upon which we have proceeded is simple: top management is responsible for policy formulation, while the Services are responsible and accountable for implementation. Management decisions are made at the appropriate level so that only high priority problems are addressed by top management. Day-to-day management is left in the hands of the Services and program personnel. The dollar threshold of programs which require review by the Defense Systems Acquisition Review Council (DSARC) was specified so only the highest priority programs are reviewed by top management. In addition, unnecessary reviews have been avoided by delegating production decisions to the Services for those programs that have not breached their thresholds. Indeed, the number of standard DSARC milestone reviews has been reduced from four to two for major programs.

Improving Cost Control

A basic dilemma which we face is that in order to save money in the long-term, we must often invest it in the short-term. Since Congress controls the funding, we are particularly dependent on congressional support for the success of many of our initiatives. With the support of Congress, we have enjoyed particular success in reducing costs through up-front investments in multiyear procurement. The 32 multiyear programs which Congress has approved during the past four years are estimated to save over $4.0 billion in then year dollars over annual contracting methods. Additional savings of over $2.0 billion will be achieved through investments in more economic production rates for systems which we have proposed to and were budgeted by Congress. Our efforts to ensure more realistic cost estimates by requiring the use of independent cost reviews and by applying more realistic inflation guidelines has established an important foundation for more realistic budgets in the future. The record already shows that we have made

significant progress in controlling cost growth. The CBO has confirmed our finding that the rate of cost growth for major systems has been reduced from about eight percent in 1981 to less than one percent in 1983.

Achieving Greater Program Stability

Improving the affordability of our programs depends upon achieving greater program stability through eliminating arbitrary program changes, and controlling the number of programs which claim our limited resources. We continue to take the necessary internal management steps consistent with this view. Each of the Services has a management system which discourages arbitrary program changes by establishing a recognized baseline. In addition, we have reduced the number of approved new program starts to an essential affordable minimum. At the same time, we have cancelled 188 lower priority programs during the past four years which reduced our funding requirements $18.7 billion. Unfortunately, improved program stability ultimately depends on full budgetary support, a matter which lies, in part, beyond the control of the Department. Acquisition funding has been reduced by more than $100 billion below five year projections established in FY 1981. As a result a considerable number of program stretchouts have been dictated.

Improving Support and Readiness

We have established the foundation for significant enhancements in the support and readiness of our systems. Policies and procedures for improving support and readiness are largely in place. The Services have revised top-level acquisition directives and policies on Integrated Logistic Support (ILS) to incorporate our support and readiness initiatives. Organizational responsibilities and procedures have been realigned for establishing support and readiness requirements; for developing and acquiring support systems; for reviewing ILS and readiness at key acquisition decision points; and for testing and evaluating feedback from the field on weapon system support.

Early emphasis on support and readiness is being given by assigning readiness objectives to new programs and by focusing top management attention on structuring development programs and providing front-end funding to improve reliability and support characteristics. Incentives for improving support are being used and encouraged. In addition, we have provided greater visibility to ILS funding during our budget review to ensure that ILS requirements are met. We have systematically reviewed the logistic support requirements and funding for 29 major systems to insure that they were fully funded to meet the Services' stated requirements.

While we expect these initiatives to have enduring impact, recent indications are that improvements in readiness are already being achieved. Mission capable rates for our tactical aircraft, for example, have improved significantly since FY 1980. The reliability of the F/A-18 aircraft is more than double that of its predecessors and it is being operated with a 20% reduction in squadron maintenance personnel.

Enhancing Competition

The increased emphasis which we have placed on using competition has begun to show impressive results. Competition goals have been set, and competition advocates and supporting staffs are in place. New policy guidance has been issued through the release of DoD Directive 4245.9, Competitive Acquisitions.

Emphasis has also been placed on clarifying our policies on acquiring and using rights in data. On major new hardware contracts, the Air Force has implemented a requirement to obtain unrestricted rights to technical data not later than five years after initial delivery. This will provide essential data to firms wishing to bid on spare parts and should significantly expand the defense supplier base. Other specific actions are being taken as part of the spare parts procurement reforms which are discussed in detail later in this section. We are also working to reduce the paper work, required for small contracts to encourage greater participation by small businesses.

The record shows significant improvement in competition during the last four years. In FY 1980, the value of competitive awards in DoD was $25.1 billion. By the end of FY 1984, competitively awarded contract dollars reached about $53.4 billion, or an increase of 12 percent over FY 1983. In addition, the number of competitive awards on procurement actions has increased from 4.4 million in FY 1980 to six million in FY 1984, an increase of almost 37 percent.

Preplanned Product Improvement

Preplanned Product Improvement (P3I) is an area we need to emphasize more. There is potential for significant savings when we can extend the life cycle of a system which might otherwise be curtailed. The direct savings of amortizing the production costs of the basic system design over a longer period is obvious. But we also enhance readiness, because we don't need to start over training people or building up the support base as we do with a new system. On the indirect side, P3I provides options for deploying new subsystems when they are ready to field which removes the need to deploy totally new systems to react to the appearance of new threats.

Defense Acquisition Improvement Program Summary

The DAIP is a dynamic program through which we have accomplished a great deal during the past four years. Initiative number 23 of the original 32 initiatives emphasized implementation as a separate action with equal priority to the other initiatives. Consequently, we continue to conduct periodic reviews of the initiatives in order to assess the progress which has been made and the problems and opportunities which remain. If additional actions are required in order to achieve full implementation, the DAIP remains flexible enough to allow for necessary adjustments. For example, during the past year, the Deputy Secretary completed a review of the DAIP initiatives and determined that an additional priority

initiative to enhance industrial responsiveness warranted special high level management attention. A working group has been formed and an agenda established for FY 1985. The DAIP will continue to address our most pressing acquisition problems and will adapt to the acquisition management challenges of the future.

JOINT PROGRAM MANAGEMENT

The historic intent of the Congress remains as clear today as it was in its early charge to the Secretary of Defense--to assume responsibility for enhancing effectiveness, economy, and efficiency in management activities common to more than one military department. What is different is that vastly greater threats and new technology now demand cooperation and efforts to achieve combined effectiveness in ways which could not have been foreseen when Congress enacted the DoD charter into law. At the same time, technology and advances in management now offer opportunities which previously appeared to be beyond our grasp. These include opportunities for joint activities to help significantly in offsetting the dangerous quantitative superiorities of the threats which continue to confront us and our allies.

Joint ventures or new technology are not ends unto themselves; rather, the end is enhancement of joint warfighting capabilities across the Services. There are a number of important criteria which must be used to determine whether or not it is advisable to pursue a joint program:

- Will the investment in a joint program make real improvements in combat effectiveness?
- Will the joint effort support our military doctrine? Joint programs must develop capabilities suitable for use in support of combined Service doctrine, including the inevitable changes and refinements to which it is subject.
- Is there joint agreement on the mission needs? A mission area frame of reference by all participants in the Planning, Programming and Budgeting (PPBS) and DSARC systems is an essential prerequisite.
- Does it make sense to develop and produce a system jointly? Or should joint efforts be incorporated into only the appropriate phase of a program?

Agreement on each of these areas does not come easily. Valid differences exist among Services on mission, operational, and technical requirements. The challenge is to identify areas where potential for capability improvement or cost savings exists, and to direct management efforts accordingly.

We have instituted special high level management bodies to address the opportunities and challenge of joint program development and management. Examples include the Broad-Area Surveillance Executive Committee (See Naval Warfare), the Interdiction Executive Board, the Command, Control, and Communications Executive Committee, and the DoD-wide Munitions Council. In some cases, it has also made sense to focus broad-based research and technology efforts toward a specific goal. The Strategic Defense Initiative Executive Committee currently serves this function. More mature evolving mission areas may also require high level management support, such as we provide through the Interdiction Executive Board.

High level management support is complemented by Special Joint Service management support. For example, the Army and Air Force formed a force development group to integrate operational and technical requirements related to a number of programs. As a result of that group's efforts, the Army and Air Force developed a list of 31 joint initiatives to provide an increased combat capability at reduced cost, including agreement on the platform and operational concept for the Joint Surveillance and Target Attack Radar System and the development of a complementary family of weapons.

In addition, the Joint Requirements and Management Board (JRMB) made recommendations approved by the Secretary of Defense to reduce the number of lethal cruise missile programs in order to pursue a more focused and balanced development program for both the stand-off ballistic and cruise missile capability.

The anti-armor mission is another major element of air/land combat that has clearly needed joint oversight if there is to be timely rationalization of operational and technical requirements. An Anti-armor Master Plan Steering Group has been formed to evaluate the potential for greater coordination and joint program management. The Steering Group provided an initial report on improvements in anti-armor mission area management to the Congress in March 1984.

The oversight role of the Joint Logistics Commanders (JLC) is critical for effective joint program management. This very senior cross-Service acquisition body sets the standard and pace for individual programs. It meets regularly and reviews activities and recommendations of some 50 subgroups. Coordination by the JLC assists in achieving maximum commonality and economies of scale for major programs such as the three versions of the H-60 series helicopter. The UH-60 Black Hawk developed by the Army, the Navy's Sea Hawk SH-60, and the Air Force's Night Hawk HH-60A are derivative helicopters using the same basic airframe. The Joint Services Advanced Vertical Lift Aircraft (JVX) is another example. We are seeking out possibilities for similar cases where single-Service development can have broad applications.

We are also providing increased emphasis to testing and evaluation across Services. Thirty joint tests have been started since the Joint Test and Evaluation Program was initiated in 1972. Current tests include Identification Friend, Foe, or Neutral; Joint Forward Area Air Defense; Joint Logistics Over the Shore; Electro-optical Guided Weapons Countermeasure, Counter-Countermeasure Program; Command, Control and Communications Countermeasures; Joint Live Fire; Joint Chemical Weapons; and Data Link Vulnerability. More work is needed in establishing common standards in the test area--as well as in the logistics support for our systems--to advance technical compatability and interoperability.

In selected technology base areas where potential is very high and applications very broad, we do not hesitate to create special management and funding procedures. The Very High Speed Integrated Circuit program, the Ada high order computer language program, and the computer software initiative program are such areas--with joint program offices

established under management of the Office of the Secretary of Defense. Formal bodies have also been set up to coordinate complementary efforts in technical areas such as electronic devices, propulsion, and guidance and control.

Last year's Defense Science Board summer study on joint programs identified program stability as perhaps the most critical element to the long-term success of joint program efforts. Priorities can and often do change over the long course of program development and production. Resource availability reflects changing priorities. Joint programs, which involve a number of participants, are the most vulnerable to changing program and budgetary priorities. Consequently, it is incumbent upon all participants in the program and budget process including the Congress to recognize the particular necessity of maintaining program stability for joint programs.

SPARE PARTS PROCUREMENT REFORM

The Services and the Defense Logistics Agency are aggressively implementing directives issued by the Secretary during the Summer of 1983 to correct problems uncovered by DoD personnel concerning our management of spare parts procurement, particularly the payment of reasonable prices. Departmental action to correct the abuses and inefficiencies of the past has been swift and effective. It is important, however, to recognize that difficulties with spare parts procurement are not new. Moreover, in a system which handles approximately 15 million procurement transactions per year, it is extremely difficult to identify every instance of impropriety. Nevertheless, we are committed to continue our comprehensive efforts to ensure a proper, cost-effective approach to spare parts procurement, and to see that any transgressions are corrected.

In response to the direction which the Secretary provided, we have accomplished a number of significant actions which have curbed immediate excesses and which have established a foundation for effective management in the future. For example, a revised regulation has been issued to enhance efforts to acquire spare parts competitively, or from the actual manufacturers, rather than from prime contractors (usually at a higher price). Managers have been appointed to identify parts for breakout and competition at all cognizant activities. Additional personnel have been acquired, or are planned, to screen spare parts on a department wide basis for which the annual buy exceeds $10,000.

Problems with the acquisition, storage, update and retrieval of reprocurement data packages are being addressed. Automatic processing systems have been designed and are being funded on a phased basis. Plans call for equipment to be purchased over a 10 year period beginning next year.

A third area of emphasis involves the development and test of a new procedure to provide incentives to major systems contractors to plan and manage spare parts so as to maximize competition. The Services are identifying appropriate systems to test these techniques and will implement the procedures which indicate the highest potential for increased competition.

Increased resources are being allotted to value engineering activities to apply

their special techniques so as to determine the intrinsic cost of parts and identify substitute parts where costs can be cut.

Existing policies and regulations have been reviewed and revised, as appropriate, to stimulate competition and the payment of reasonable prices. For example, the Parts Control Program was made mandatory. This will maximize the use of standard parts in development, rather than high-cost, specially designed parts. In another area, criteria have been developed to flag increases in prices and to require special review, analysis, and justification of these increases.

Training has been increased with respect to pricing, breakout, and other related spare parts management. The Inspector General's Office has conducted broad-based investigations on spare parts management at all activities and will continue to evaluate the resultant implementation. Performance evaluation factors for personnel involved in spare parts acquisition have been revised to reward actions that increase competition and save money.

In addition to the above actions, a number of contract matters have been enhanced. Spare parts planning is now included in the advance acquisition planning process for systems and is being made a consideration in source selection of contractors.

There is considerable evidence that our spare parts procurement reforms are working. Numerous instances of savings have been achieved in spare parts identified by DoD personnel as being overpriced.

WEAPON SUPPORT AND READINESS IMPROVEMENTS

Improvements in weapon support and readiness have the potential to be a major force multiplier equal in importance to performance factors. We will develop our investment strategies with an integrated view of current and future readiness. We now insure future readiness through consideration and funding of readiness/support related items early in the design and development stage of our weapons acquisition process.

The challenges we face involve application of technology, and management of our developments to achieve improvements in readiness of our weapons and support systems. To this end we must include Reliability, Availability and Maintainability (RAM) advances in many of our technology base programs; we must develop support technologies to match new weapon system technologies (as in VHSIC, fiber optics, and composites); we must include weapon support advances as inherent elements of our weapon programs, and we must apply technology to improve the logistic systems which support our weapons.

We are strengthening the emphasis on supportability in new weapon programs to be sure that early technology efforts include consideration of advances in weapon supportability as well as performance. Specifically, we intend to seek advances in reliability in order to reduce the support requirements of future weapons. Examples of new weapons on which these efforts are focused include the

Advanced Tactical Fighter (ATF), the Army's light weight experimental helicopter (LHX), the Navy's Advanced Tactical Aircraft (ATA), the Mobile Protected Gun System (MPG), and the Joint Service Advanced Vertical Lift Aircraft (JVX). This increased emphasis on reliability, availability and maintainability will result in higher readiness of our deployed forces.

In parallel with this early focus on support characteristics, we encourage proposals for technology base demonstration projects which have very high leverage in improving weapon support and the logistics infrastructure.

The FY 1986 budget request includes $50 million to initiate or accelerate R&D projects to improve weapon support and logistics. After a comprehensive review a number of projects to conduct feasibility demonstrations in the 1986-1988 timeframe have been identified. These have direct applicability to the supportability of our future weapon systems. Some examples of where we have focused attention are:

- Packaging and partitioning avionics to demonstrate the capability to operate for long periods without the need for maintenance and eliminate the requirement for avionics shop testers.
- Reducing false and incorrect maintenance actions through integration of diagnostic aids, both internal and external to the weapon system.
- Seeking improvements in all types of technical information to include manuals and training aids through system integration of contractor data bases. Improving access to technical information by using automated drawings, storage and retrieval devices, automated technical manual generation, and user terminals.

In addition to these projects, we are increasing efforts in long overlooked technology areas such as calibration, field repair of composite materials, and improvement of basic design knowledge and techniques for reliability and maintainability. We intend to continue to give priority and funding to innovative ideas in the crucial weapon support and logistic areas.

INDUSTRIAL RESPONSIVENESS

During the last decade, the U.S. heavy industrial base experienced its greatest decline, with detrimental effects on both the civil and defense sectors. During this same period the Soviet Union was rapidly expanding its industrial base, which is dedicated to armament production. To reverse the decline of U.S. industry we have taken a number of actions. Significant improvements have resulted from the policies and programs established during the past couple of years.

The Deputy Secretary of Defense has directed a new high priority industrial base responsiveness initiative. This effort is designed to ensure the proper integration of industrial base considerations into the weapon acquisition process, and to identify issues and propose resolutions which will enhance the responsiveness of the industrial base. Industry joined with us to meet the challenges in the areas of surge production assessment, improving productivity and quality, and reducing acquisition costs. The Military Departments have revitalized their respective industrial preparedness programs and the Congress, for the first

authorized funding for investment in strial surge responsiveness. A ber of initiatives, ranging from the strial Modernization Incentives ram to our efforts to encourage more effective contract requirements are implemented.

Defense Industrial Base Guidance

Defense Industrial Base Guidance ctives have been defined and itized, including establishing the strial base program as a DoD mission . There are four basic program ctives: (1) peacetime production iencies, (2) production surge bilities, (3) wartime sustainability, (4) effective industrial preparedness ning. Surge investment is funded for first time in FY 1985 to provide lerated production of the TOW 2 ile. The Joint Chiefs of Staff have emented a program to identify and itize the most essential warfighting eriel needs from the perspectives of the ied and Specified commands that will ide a common baseline to allocate ce resources to improve industrial onsiveness. Well qualified industrial ners have been assigned to each of the tary Departments and the Defense stics Agency to review and analyze the istrial base needed to support the artment. Manufacturing Technology Industrial Modernization Incentive gram investments are growing with onstrated results in terms of improved ucibility and productivity. Defense strial base planning guidance will be ner refined for the FY 1987 Defense lance.

The Defense Production Act

The Defense Production Act (DPA) provides the single legislative authority for essential industrial readiness programs designed to maintain the national defense. Since 1950, we have relied on this authority to maintain ongoing defense production contracts needed to support national security objectives. The B-1B bomber and Blackhawk helicopter are two programs for which we have used the priority rating authorized by Title I of the Act to maintain production schedules and ameliorate costs. The DoD has worked directly with the Department of Commerce in revising their regulations for implementing Title I and for maintaining a system of industrial priorities that would be necessary in time of emergency. The DoD is updating its internal procedures to incorporate the new Department of Commerce regulations.

In addition to our dependence on foreign sources for many raw materials, we are also experiencing a decrease in our domestic capability for processing and manufacturing a number of industrial products. Title III of the Defense Production Act authorizes government financial incentives for encouraging private sector investment in increased production capacity when it is necessary to support the national defense. We are examining this method of establishing or expanding needed domestic industrial capability, particularly in areas where foreign dependence could be damaging to our national security.

National Defense Stockpile Of Strategic & Critical Materials

The fundamental purpose of the ckpile is to ensure a secure supply of tical raw materials to support the litary, industrial, and civilian needs of : United States during an emergency. e Emergency Mobilization Preparness Board's working group on lustrial mobilization has begun a tional Defense Stockpile study. This idy includes assessment of scenarios, sumptions and econometric models used a basis to develop stockpile goals. We pect to develop new requirements for ckpiling through this reassessment of r current methodology.

Manufacturing Technology Program

The Manufacturing Technology ogram is a broad-based program to iprove the productivity and sponsiveness of the defense industrial se by investing in advanced technologies the production of DoD materiel. This ogram has been in existence for over 20 ars, and we intend to continue to give it iority attention because of its monstrated high-payoff record and its ility to improve industrial productivity a broad national basis. One recent complishment is a manufacturing ocess for producing "crimped" miniature arings and shaft assemblies for the rbine alternators used in mortar multition fuzes. Another accomplishment is Automated Propeller Optical easurement System (APOMS) which rmits inspection of large ship propellers eight hours versus 140 hours by evious methods.

Defense Economic Impact Modeling System (DEIMS)

In a major outreach effort, the DoD has made available projections of how much it intends to spend on a wide range of commodities and services over the next five years. Thus, for the first time, American business has access to projections on billions of dollars worth of defense-related purchases. DEIMS translates the DoD budget into projected levels of purchases for different industries. Both direct purchases by DoD and purchases of subassemblies, parts, and materials that go into defense goods are projected. By supplying information on what it plans to buy, the DoD hopes to stimulate a response from industry and generate new business opportunities that will broaden the competitive business base and assist the Services. By helping industry plan for defense business, we make it more likely that the DoD will have what it needs to carry out its missions.

QUALITY AND PRODUCTIVITY

While reliability and productivity have always been important management objectives, they will receive greater emphasis in the future. During the past four years, emphasis has been placed on repairing the programmatic effects of a decade of defense underfunding, and upon initiating new programs necessary to maintain our national security into the future. Relative emphasis must now shift to ensure that the investments we have made are protected and reach fruition. We are committed to improving the quality of the products we buy and are directing management efforts to achieve our quality goals.

ology Demonstration

)efense Nuclear Agency (DNA) is
ıg new technologies to assure
l force survivability in the face of
gly more accurate and larger
)viet missiles through the
l Silo Hardening and Hardened
auncher research programs
l jointly with the Air Force. Also,
n of the major underground
ffects tests, MIGHTY OAK and
; NOTE, and construction of
N CYBER and MINERAL
', will directly support advanced
levelopment such as the MK-5
)ody and the TRIDENT II D-5
ystem. In addition, DNA will
a joint demonstration of the
ies that can be achieved on a
Air Command mobile command
ng Defense Communications
shelters, computers, and
cations. Given the diversity and
l growth of the Soviet nuclear and
)nal threat, a substantial weapon
sting and survivability program
ired to assure meaningful
:e in the future. Continuation of
;earch programs will lead to a
vivable and more capable force.

ıtic Effects

)83 DoD expanded research on a
ıge of issues associated with the
m global climatic effects of
nuclear bursts. This program
research on several fronts and at
us government laboratories,
ıies and contractors.

program emphasizes research in
nd dust source terms, large-
: characteristics, particulate lofting, the chemical kinetics of fires and fireballs, and climatic effects.

Current Objectives

In future years we must fully consider total weapon system cost and performance in establishing military requirements and design objectives for nuclear weapons. We must also define the character of the future stockpile in view of improved weapon systems capabilities and changing requirements. It is also essential that we continue to improve upon the survivability and endurance of our forces and support infrastructure--both in CONUS and abroad. We also plan to determine the feasibility and suitability of applying nuclear directed energy technology to specific weapons applications. Finally, the modernization of our capital plant and infrastructure for nuclear weapons and weapons materials research, development and production must continue.

CHALLENGES AND OPPORTUNITIES

The greatest challenge facing U.S. strategic forces is maintaining our country's will to stay the course in modernizing our forces. We are faced with a formidable adversary who possesses steadily increasing capabilities, yet is rarely subject to changing military strategy or wide variations in funding. The Soviets are not content to maintain comparability but are dedicated to obtaining and maintaining clear military superiority. In response, we cannot afford a changing commitment to defense over time. We have a program for modernizing our strategic forces--proposed by President Reagan in 1981--and we now need the continuing commitment to bring that program to fruition in the years ahead.

urity objectives. Several initiatives are ng pursued in support of this goal. We e continuing the design and production nuclear weapons to support our strategic dernization initiatives and to replace solete weapons with new designs which e inherently more effective, safe, and rvivable. We will retrofit selected ockpiled weapons with current chnology to improve overall safety and nmand and control.

We are working with the Department Energy to strengthen our nuclear apons technology base. A research ogram for assessing the climatic effects nuclear war will be enhanced to reflect r level of concern. We are also veloping long-range plans that will low us to meet future defense needs, hen considering the constraints of nited resources or potential requirement anges that could result from either a ajor nuclear threat increase, chnological surprise, a new arms control greement, or a change in national rategy.

Major Achievements

An example of our progress during the st year is the continuation of the nuclear eapons modernization program in operation with the Department of nergy. The GLCM and Pershing II uclear weapon systems were also ccessfully deployed.

Additionally, increased emphasis has een placed on nuclear weapons rvivability. We are using the NATO nior level management groups, eviously established to address nuclear eapon security, as a forum to also raise rvivability issues. Survivability of all new weapons systems which may be required to operate in a nuclear environment is also receiving more attention. The Defense Nuclear Agency has been assigned the role of assisting the Services, agencies, and OSD to insure the improved survivability of new systems.

The biannual Nuclear Weapon Development Guidance process leading to a report in 1985 began with technical advisory team visits with the CINC's and Services to identify nuclear weapon requirements for the 1990's. To complement this activity, working groups with representation by the Services and DoE national laboratories have been established to address specific nuclear weapon topics that would clarify future needs.

Also, improvements in the nuclear weapons development process were made and documented this past year. The Supplement to the 1953 Agreement for the Development, Production, and Standardization of Atomic Weapons between the DoE and the DoD was updated to provide procedures for formal design definition and cost studies. The implementing DoD Directive was also revised to promulgate the changes.

A memorandum of agreement (MOA) between the Department of Defense and the Department of Energy for a joint program of strategic defense research and technology development was approved this year. The steering committee formed by the MOA will ensure that the DoE advanced research activities will be fully integrated into the DoD managed SDI program.

e availability of a mixed cruise /ballistic missile theater nuclear llows NATO planners to hedge Soviet action directed at one of the ;. Even though NATO's nuclear le will be at its lowest level in over 's, the addition of Pershing II and to our NATO deterrent force s a leverage that is responsive to iet threat.

other notable NSNF development s the modernization of the 155mm r artillery projectile. The new designated the XM785, will have a :ant increase in yield, in lethal gainst armor formations, improved :y to reduce collateral damage, and double the range of the old M454 will replace. Our efforts this year :us on performance testing of the motor and fusing system along with :rm storage tests. With continued t in the Congress, we can field this /ed round before the end of the .

RANGE FORCE PROJECTION

ıere are several new initiatives way which could have wide ıtion for force projection missions, ı show of force to theater-scale :e. Conventional conflicts and uent U.S. involvement could come number of locations throughout the some of which are close to our . Missions could encompass both ased and sea-based objectives such :nse suppression, interdiction, deep , ocean surveillance, sea line of ınication (SLOC) defense, anti- e warfare, and mine laying, etc. systems could also provide the platform for use of emerging technology (ET) weapons. The two specific initiatives are the TOMAHAWK sea launched cruise missile with its TOMAHAWK conventional anti-ship missile (TASM) and conventional land attack variants (TLAM/C) and the B-52 Strategic Conventional Standoff Capability (SCSC).

Operational testing is underway on TOMAHAWK with the TASM deployed aboard both ships and submarines and TLAM/C scheduled for initial deployment later this year. Our work in SCSC centers on determining the feasibility of existing sensors and weapons to enhance the conventional targeting capability of present and future strategic bombers. This would be accomplished through a prototype demonstration of both active and passive systems using a non-ALCM B-52 as a testbed. The work would also include an evaluation of our expanding arsenal of long-range standoff conventional munitions. Two squadrons of our B-52s will shortly be equipped with the conventional HARPOON anti-ship missile. Eventually the SCSC would permit a dedicated portion of our long range bomber force to autonomously detect, track, identify, engage, and destroy mobile, fixed and maritime targets using conventional off-the-shelf munitions. The long range of our bombers permits their use worldwide in a matter of hours, while sensor technologies and standoff weapons permit them to remain outside the range of lethal defenses.

NUCLEAR WEAPONS

Goal

The goal of the nuclear weapons program is to provide and maintain a safe, survivable and effective nuclear weapons stockpile in support of U.S. national

The Strategic Defense Initiative Organization (SDIO) is now operating as an agency within the Department of Defense, with its Director reporting directly to the Secretary. The first year budget has been approved by the Congress. It will allow direct industry input into the ongoing definition of potential technologies and architectures which together are designed to provide a future president and Congress with sufficient data and concepts on which to base development and deployment decisions.

While the U.S. has long maintained some research activity on technology applicable to strategic defense, the Strategic Defense Initiative Organization will expand upon and focus relevant ongoing technology efforts being conducted by the military services, national labs, and technology-specialized agencies into one cohesive and coordinated whole. The SDIO is pursuing technology in five key areas--surveillance, acquisition and tracking; directed energy weapons; kinetic energy weapons; systems analysis and battle management; and a variety of support areas such as space electrical power, heavy lift launch vehicles, space weapons lethality, and spacecraft survivability.

NON-STRATEGIC NUCLEAR FORCES

While the Soviets continue their steady expansion in theater forces in every major category--tanks, artillery, helicopters, missiles, etc.--we, and our allies, continue to exercise considerable constraint. Since 1979, we have removed more than 2300 nuclear warheads. Our deployment of the new Pershing II and Ground Launched Cruise Missile (GLCM) is being done on a one-for-one basis. On the other hand, the Soviets have deployed about 400 SS-20 missile systems, each missile having three warheads, and reload capability.

The increasing Soviet nuclear threat makes our job in development of responsive non-strategic nuclear forces (NSNF) more difficult. These forces are essential because they show our firm resolve to defend our allies and deter the use of nuclear weapons by Soviet/Warsaw Pact forces in the event of a conflict.

We--along with our Allies--are only now beginning to upgrade our NSNF in response to the impressive force expansion by the Soviets. For several decades, our efforts have not kept pace. With the deployment of Pershing II and GLCM in 1983, however, we are beginning to reestablish our capabilities. The Pershing II, with a range of 1800 kilometers, is steadily replacing the shorter-range Pershing IA now in Europe. Deployment will be completed this year when a total force of 108 Pershing IIs will be operational.

GLCM, on the other hand, with its longer range of 2500 kilometers and slower response time also has improved capability and can be based farther rearward for increased survivability. GLCM will complete deployment by 1988 with 464 missiles in place. Pershing IIs are deployed in the Federal Republic of Germany while GLCM is deployed in the United Kingdom and Italy with future deployments planned in Belgium, the Netherlands, and in the Federal Republic of Germany.

Our objectives in strategic air defense to detect, identify, intercept and roy enemy forces that might attack the

In atmospheric defense, we are king hard to upgrade our ability to ride timely, credible warning of Soviet ber and cruise missile attacks. In the 20 years, we have allowed our ospheric defensive forces to wither. rs ago we had 2600 interceptors while ay we have about 300. When we alled the Distant Early Warning W) system many years ago, it was a der of modern technology. Today, even n upgrades over the years, it is obsolete nically and not as effective as required inst modern air-breathing threats, and increasingly expensive to operate and ntain.

We have begun the long road back in se areas. We are supporting an ressive deployment program for the r-the-Horizon Backscatter (OTH-B) ar surveillance system, completing the loyment of 13 Minimally Attended lars (MARS) in Alaska; beginning work the North Warning System (NWS) to se low altitude coverage gaps, and rove radar performance on the DEW , and continuing replacement of our ng F-106 air defense interceptors with modern F-15 and F-16 fighters. velopment of the North Warning tem (which will replace the existing w Line) and Over-the-Horizon kscatter (OTH-B) radars are intended provide the National Command thorities (NCA) with credible, timely tical warning to increase survivability trategic retaliatory forces.

For Ballistic Missile Tactical Warning/Attack Assessment, a network of sensors provide our National Command Authorities with ballistic missile attack warning and assessment. These sensors include space satellite systems; Ballistic Missile Early Warning System sites in Alaska, Greenland, and the United Kingdom; the Perimeter Acquisition Radar Attack Characterization System (PARCS) radar in North Dakota; sea launched ballistic missile detection and warning sites (PAVE PAWS) in Massachusetts and California; and the AN/FPS-85 and AN/FSS-7 sea launched ballistic missile detection radars in Florida.

The Ballistic Missile Early Warning System (BMEWS) modernization program is replacing existing 20-year old conventional radars at the Thule AB, Greenland, site with a new solid-state phased-array radar. The new system will become operational in late 1986. This will improve system performance and capacity and provide better pre-impact assessment.

To accommodate the increased Soviet sea launched ballistic missile (SLBM) threat, two new PAVE PAWS radars are now under construction in the southeastern and southwestern United States.

In space defense our Anti-Satellite (ASAT) program is back on track and schedule. We tested the Air Launched Miniature Vehicle (ALMV) late last fall against an infrared source. This year, after meeting the conditions directed by the Congress, we can begin testing against objects in orbit to determine the capability of ASAT to deter threats to U.S. and allied space systems by placing Soviet military satellites at risk.

accuracy specifications and we are pleased with the reliability of the missile as demonstrated by the successful flight teststo date. Construction is on schedule in the deployment area. Missile and basing production lines are underway and, in terms of funding, the program is about half complete. The Peacekeeper program is on target in terms of schedule and cost and we plan to achieve an initial operating capability in December 1986. We continue to believe in the near-term necessity for the Peacekeeper ICBM in terms of military capability and arms reduction negotiation leverage.

To enhance strategic stability, the Small ICBM program provides for decreased strategic target value with its single warhead and increased survivability due to its adaptability to various basing modes. The contracts for small missile system definition, missile technologies, and basing technologies were awarded last year to support a full scale development tart in late 1986 or early 1987. With a planned nine-year development cycle, this program will challenge our development capabilities, and we are proceeding with an aggressive development schedule to overcome the major technical challenges of low missile weight, lightweight/accurate/responsive guidance systems, and hardened mobile launcher hardware.

Recent testing of advanced, super-hardened silo designs has demonstrated levels of hardness that were previously believed to be unattainable. This break-through in silo hardening technology is still evolving and will be applicable to all future ICBMs. Yet harder designs are now being fabricated, and we expect further testing this year that should provide further evidence and assessment of the full potential of this technology.

STRATEGIC DEFENSIVE FORCES

About one-third of Soviet procurement for strategic forces has been for procurement of strategic defense systems (including ballistic missile and air defense but excluding civil defense). The Soviets have installed and maintained a large strategic defense force to defend against a large and diversified threat from many nations. It includes the world's most extensive air defense of the homeland consisting of thousands of radars and interceptor aircraft, and a limited ballistic missile defense of Moscow. It is estimated that over the past decade the dollar cost of Soviet strategic defense procurement has been more than the cost of U.S. strategic offense procurement. In particular, Soviet strategic air defense is estimated to cost much more than U.S. expenditures on strategic bomber procurement which, presumably, the Soviet air defenses are designed to counter.

The Soviet's strategic air and missile defense activities undergo constant modification and improvement. New generation Soviet SAMs, a new look-down/shoot-down fighter (FOXHOUND) and a new Airborne Warning and Control System (AWACS) platform are coming into service, along with new or modified anti-aircraft missiles. In ballistic missile defense they are now upgrading the interceptors around Moscow. Also nearing completion are six very large radar sites located throughout the Soviet Union for early warning and possibly ABM battle management.

In the cruise missile area, we are continuing to wind down the ALCM-B (AGM-86B) program with the last buy in FY 1984 and the last delivery in FY 1987. We now have more than five squadrons of B-52 aircraft equipped with external ALCMs. This represents a significant achievement since the first ALCM squadron went operational in December 1982. A total of about 1750 ALCMs will be delivered to the Air Force by FY 1987. Planning is on schedule toward supporting ALCM-B testing in Canada and two live launches are planned for February 1985. First deliveries of the Advanced Cruise Missile (ACM) are planned for the late 1980s. With its reduced signature, longer range, and improved guidance, the ACM will ensure the continued effectiveness of our strategic cruise missile forces for years to come. The continued support from Congress has allowed us to make a smooth and orderly transition from ALCM to ACM without any gap in deliveries.

Other notable events last year include: award of the initial study contracts for the Short-Range Attack Missile, Version II (SRAM II; formerly known as the Advanced Air-to-Surface Missile); continued modification of our B-52 aircraft for ALCM carriage and maintainability/flight safety; and delivery of first KC-135R reengined tanker to McConnell AFB, Kansas with an IOC planned for 1985.

Sea-Based Forces

Sea-based strategic weapon systems provide the greatest assurance into the foreseeable future of a survivable retaliatory force. Our efforts in this area, from basic research programs through new weapons systems to improved operating procedures, are intended to maintain this high- confidence deterrent.

Since the commissioning of the first TRIDENT-class submarine (USS OHIO), the Navy has received four more with the USS Henry Jackson (SSBN 731) delivered on 6 October 1984. The sixth boat, the USS Alabama, is scheduled for delivery this coming June. These submarines provide a significant measure of deterrent capability, and our steady progress in deploying these submarines is providing a cost-effective transition from a submarine force designed in the 1950s to one that will ensure a high confidence, sea-based deterrent well into the next century.

Complementing the new TRIDENT-class submarine will be the TRIDENT II (D-5) missile. This new SLBM will have sufficient accuracy to place Soviet hard targets at risk. Eventually, it will be deployed throughout the SSBN fleet. Full scale engineering development began last year and the initial motor firings are imminent. We expect to conduct the initial guidance system test flights by October of this year. We continue to expect an initial operating capability for the D-5 missile on or before December 1989.

Land-Based ICBM Forces

The need to modernize our ICBM forces for the tasks of the 1980s, 1990s and beyond still requires near and far term solutions. In the near term, the Peacekeeper ICBM is needed to redress the growing asymmetry between the hardening of Soviet high priority assets and our ability to place these assets at prompt risk. Our testing program remains on course.We are consistently exceeding

Ground Wave Emergency Network (GWEN) scheduled for next year. GWEN will provide a long-range, highly reliable strategic communications system using ground wave relay technology and proliferated operating nodes.

Our efforts to upgrade the Navy Take Charge and Move Out (TACAMO) communications aircraft continue. After a thorough review of all alternatives, we have concluded that the E-6A (Boeing 707) is the preferred approach from an airframe point of view. We are also pursuing Very Low Frequency (VLF) upgrade for the TACAMO mission to enhance our capability to provide critical communications to TRIDENT submarines deployed in the Pacific.

To upgrade peacetime communications to deployed submarines and to support the transition to wartime operations, we are constructing a dual-site, Extremely Low Frequency (ELF) communications system. Submerged submarines must now deploy an antenna at or close to the ocean's surface to receive messages, thus potentially increasing their susceptibility to detection. This constraint will be alleviated by the use of ELF communications, which can penetrate sea water to much greater depths. The two transmitter sites in Wisconsin and northern Michigan will provide a highly reliable means of maintaining continuous contact with the submerged submarine force.

Bomber/Tanker/Cruise Missile Forces

Bombers and tankers are the most flexible elements in the strategic triad since they can be launched for survivability before any decisions are made to use nuclear weapons and controlled after launch. Bombers are also recallable and, very importantly, they can be reconstituted for follow-on missions. They can also be launched to signal national resolve during a time of crisis.

The major initiative in this area continues to be the two bomber--B-1B and Advanced Technology (Stealth) Bomber (ATB)-- programs. The B-1B remains both on schedule and within cost. The B-1B rollout was held on 4 September 1984 with the first flight on 18 October 1984--a full five months ahead of contract schedule. Delivery of one squadron of 15 aircraft to the Strategic Air Command will occur in 1986. All contractors are now operating within their budgeted costs and are either on or ahead of schedule for the 1986 IOC. On 29 August 1984, B-1A aircraft No. 2 crashed during a test flight due to improper fuel distribution management during low-level, low-speed flight. Efforts are in progress to correct the cause of the malfunction. The aircraft had essentially completed its test objectives except for initial ALCM testing.

Because the ATB program remains highly classified, we can only report that the prime contractor and key members of the development team are now in place and working. The program is progressing smoothly even though we are only in the early developmental stages. The technologies involved, however, represent extraordinary military significance in their potential to negate present and projected enemy air defenses. We are confident the ATB will extend the advantages of bombers in the triad well into the twenty-first century.

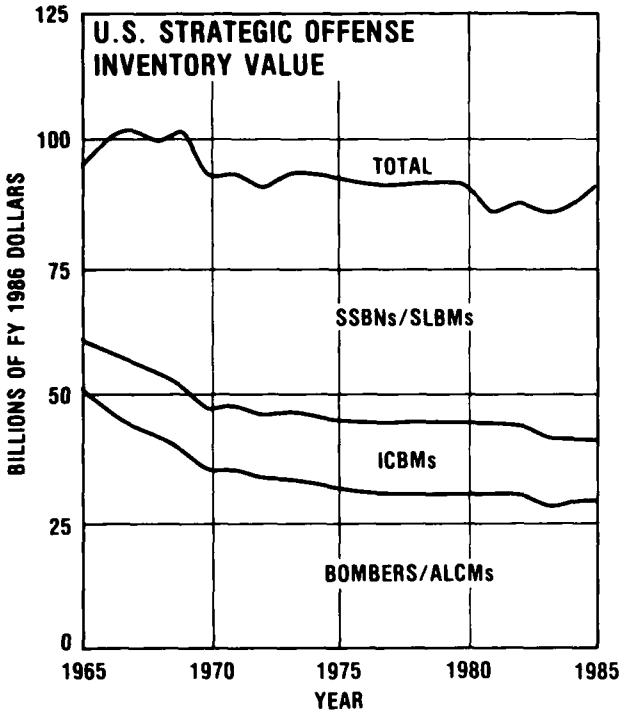


Figure IV-2. U.S. STRATEGIC INTERCONTINENTAL ATTACK FORCE INVENTORY VALUE

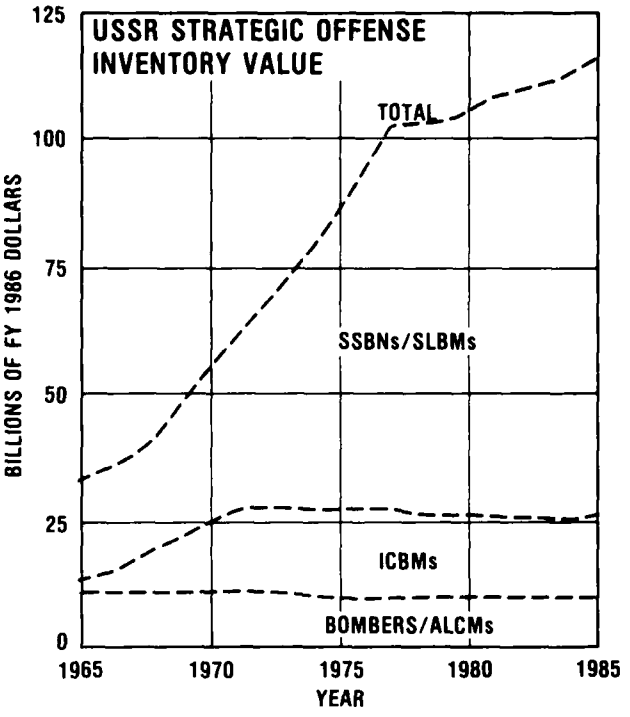


Figure IV-3. USSR STRATEGIC INTERCONTINENTAL ATTACK FORCE INVENTORY VALUE

systems (C^3I) are imperative if we are to be able to demonstrate the capability to employ our nuclear forces effectively and therefore provide credible deterrence. These systems must not only be able to survive an initial attack, but they must be able to operate during and after an enemy attack to permit a coordinated response by U.S. forces controlled by the National Command Authorities. Most importantly, they must provide the Commander-in-Chief with the highest possible confidence of detecting, identifying, and reporting to him with high confidence an enemy attack under all conditions.

A major milestone in our continuing efforts to make our critical C^3 systems survivable and endurable passed this January with the delivery of the final E-4B aircraft for the National Emergency Airborne Command Post (NEACP). Work also continues with the Aircraft Alerting Communications EMP (AACE) upgrade program for detection of potential high-altitude EMP bursts and for EMP-protection of selected communications equipment at SAC wing command posts. In addition, we successfully completed most of the preliminary design reviews for both the ground and space segments of the Milstar program.

We also are closing in on the initial operational capability--termed the Thin Line Connectivity Capability--for the

Table IV-1. PRODUCTION SUMMARY OF STRATEGIC INTERCONTINENTAL WEAPONS FOR U.S. AND USSR

CATEGORY	1975-1984 10-YEAR TOTAL		1984		10-YEAR TREND	
	USSR	US	USSR	US	USSR	US
ICBMs	2200	223	100	0	↓	↓
SLBMs	1900	540	200	80	--	↑
SSBNs	30	5	2	2	↓	↑
Bombers	40	0	20	0	--	--

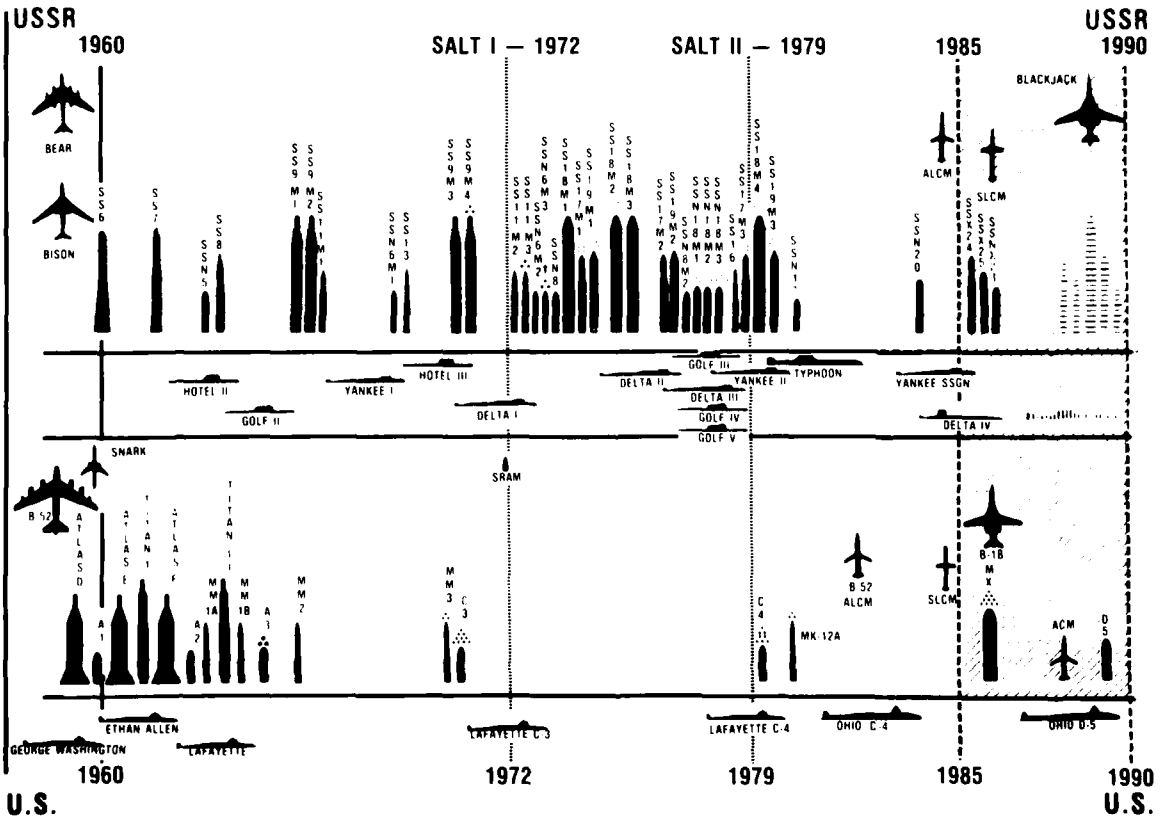


Figure IV-1. U.S. AND USSR STRATEGIC INTERCONTINENTAL SYSTEMS SINCE 1960 (DEPICTED BY DATE OF SYSTEM IOC)

has been strong popular support for a strong defense, the economic implications have made modernization difficult. The President's strategic modernization program--initiated in October 1981--is intended to decrease the likelihood of war.

INTERCONTINENTAL OFFENSIVE FORCES

Introduction

These forces consist of intercontinental bombers and associated tankers and missiles, land-based inter-continental ballistic missiles (ICBMs), submarine-launched ballistic missiles (SLBMs) and the associated submarines. As shown in Table IV-1, over the past ten years, the USSR has produced far more strategic systems for its forces than the U.S.

Figure IV-1 compares the Soviet and U.S. deployment of strategic offensive weapons systems since 1960. Note the high rate of system deployment after SALT I. As a result of these trends, the USSR has overtaken and surpassed the U.S. in numbers of delivery vehicles although it has remained behind the U.S. in total on-line missile reentry vehicles and bomber weapons. Also the USSR has overtaken and surpassed the U.S. in total throw weight, yield and equivalent megatons. The accuracy of some Soviet ballistic missiles now approaches that achieved by our best deployed systems. In addition, the U.S. strategic forces are considerably older than comparable Soviet forces.

To reverse these trends we are working to modernize each leg of our strategic triad. Our ICBM forces will be upgraded with the new Peacekeeper missile; and, later, the small ICBM, now in the early phase of development. We will continue to add new TRIDENT submarines to the undersea fleet armed with the C-4 and eventually the D-5 SLBM. The new B-1B bomber is in production, the Advanced Technology Bomber (ATB) is progressing well in development and the B-52 fleet is now equipped with about 1100 ALCMs.

Figures IV-2 and IV-3 show the estimated value (defined as the average unit procurement cost multiplied by the quantity in the force) of the major classes of weapons in the operational strategic offense forces of the U.S. and USSR. During the past 20 years, the USSR has substantially increased the emphasis on its strategic submarine force.

The preceding three figures vividly illustrate the results of the long term disparity between the U.S. and USSR in procurement of strategic offensive weapons.

The following paragraphs summarize our accomplishments in support of the President's plan. Each of the five elements of the President's strategic modernization program has presented a unique challenge for the Department of Defense and the Congress. We have made progress, and we have encountered problems; but overall, with support from Congress, hard work from defense contractors, and dedicated personnel, we are well on the way toward meeting our goals for maintaining a credible nuclear deterrent. Some highlights and significant events in these major areas over the last year include:

Survivable and Enduring C^3 I Systems

Survivable and enduring command, control communications, and intelligence

IV. STRATEGIC AND THEATER NUCLEAR FORCES

In this and the following chapters the broad achievements, management focus, challenges, goals and objectives for accomplishment of the Research, Development and Acquisition Program are discussed in the context of major military missions. Additional programmatic detail (cost, quantity, schedule) is available in the Descriptive Summaries which are provided separately.

STRATEGIC PROGRAM GOALS/ OBJECTIVES

Our basic strategy is deterrence, across the entire spectrum of conflict. Deterrence is a function of three factors: military capabilities, if called, the will to use them, and a potential aggressor's perception of the first two. Thus, implicit in our concept of deterrence is the capability and determination, should deterrence fail, to deny the enemy their objectives at any level of conflict, including strategic nuclear, a major war in Europe or the Pacific, or a small-scale aggression that has the potential to threaten major U.S. interests in other parts of the world.

The backbone of American military deterrent power is our strategic nuclear arsenal--the missiles, submarines, and bombers that can deliver nuclear warheads intercontinental distances. The destructive potential of these weapons gives them a special place in the hierarchy of military power and confers extraordinary responsibilities on those who exercise control over them. Deterring nuclear war--making that unlikely possibility even more remote--is therefore our highest national priority. Pursuing this objective requires us to give the most serious and careful attention to our strategic doctrine and plans, the forces themselves, and the process of strategic arms reductions.

Several Soviet perspectives are relevant to the formulation of our deterrent strategy. Soviet objectives are to gain their ends by coercing and intimidating others to give in to their demands because of the threat of the use of military power. If war occurs, as highlighted in Soviet writings for many years, their objectives are to seize the initiative with a devastating first strike to achieve victory in the shortest possible time, yet defend the communist state and hold out against massive nuclear strikes of the enemy with the fewest possible losses. They intend to be able to wage war for a protracted period of time and to maintain a high "moral-political" state of the population. Soviet writings conclude that they should be in a posture best prepared to fight and win a nuclear war with the U.S.

Our primary objective then is to develop and maintain strategic nuclear forces that present a fully credible deterrent in the face of changing conditions. Maintenance of an acceptable strategic balance--in appearance and in fact--strengthens deterrence by dispelling any illusion th[illegible]e outcome of a nuclear war could be advantageous to a potential aggressor. This has never been an easy task, and in recent years even though there

productivity are the result of poor quality of incoming material. Although it is the prime contractor's responsibility to exercise quality control of their subcontractors and vendors, the Department can encourage the primes to play a more active role. We strongly support, for example, the joint sponsorship by several primes of full-time, third party, in-plant inspectors in microcircuit plants (FLAIR Program).

Implement Warranties. Quality can also be improved through the proper use of warranties. The DoD has had a long history in the use of warranties. Recent changes in the law concerning the use of warranties now assure that critical performance requirements for major systems must be met under terms of a warranty. Department implementation of warranties is already in place, and we are taking action to insure that policy guidance reflects the changes which have occurred in legislation.

Modernize Factories. Modernization of factories coupled with the implementation of automatic inspection techniques will improve process control which will lower total costs while improving both quality and productivity. A major effort currently underway is the Industrial Modernization Incentives Program (IMIP) which is currently being applied on a test basis to provide incentives to industry for factory modernization. The results thus far have been encouraging. It is anticipated that the test phase will be terminated during CY 1985 in favor of broader IMIP implementation.

Provide Incentives to Personnel. The problems of low manufacturing yields and consequent higher costs of scrap, rework, and repair can be attributed in part to a lack of motivation and training to do a job correctly. An initiative is being developed on a test basis which gives priority to quality by sharing savings with employees. If the experiment proves successful, we will develop guidance for broader application.

Improve Quality Training. Because everyone has an influence on quality, from line workers through all levels of functional and general management to senior executives, each can benefit from training in the principles and methods of quality assurance. During the coming months, we will be working with industry and academia to develop a plan to improve quality training programs for all levels of personnel.

Tighten Quality Surveillance. The Department already conducts a vigorous program of audits and investigations to assist in quality assurance through identifying and correcting instances of fraud, waste, and abuse. Decisive actions such as suspension of progress payments, contract cancellation, or debarment will continue to be taken as appropriate against those who abuse the acquisition process.

"Quality" is a broad subject, and requires a comprehensive approach to insure that it is achieved. Consequently, we conducted a review during the past year in which we considered three major areas of quality and productivity concern: materials, capital, and human resources. We examined actions already underway in each of these areas, and are also considering new management ideas which will help improve our quality and productivity. We have integrated these into a program called the Defense Industries Quality Excellence Program which serves as the foundation of our long-term efforts to improve quality and productivity. Following are major initiatives of the program:

Build Quality In. We believe that quality cannot be achieved unless it is built in from the beginning. Too often in the past we have added to program costs and postponed effective operational capability dates by pursuing development programs which do not yield producible designs and supportable configurations. We have published a manual designed to aid in the transition to production by providing valuable guidance to encourage disciplined engineering in design, test, and manufacturing. In addition, we have issued a new directive (DoD 4245.7) to improve the transition from development to production.

Minimize Use of Specification/Source Control Drawings. The purpose of this initiative is to eliminate unnecessary and costly special testing requirements by using standard parts and tests. Over the past several months, we have experienced problems with inadequate testing of microcircuit devices to meet the requirements contained in contractors' Source Control Drawings (SCDs). This problem has been exacerbated because major weapon system and equipment contractors have deviated from the use of military standards resulting in the creation of an excessive number of SCDs. The Deputy Secretary has issued guidance to the Services and the Defense Logistics Agency which re-emphasizes the requirement for use of standard parts and directs actions to insure vigorous application of standardization through the DoD Parts Control Program to all weapon systems contracts.

Eliminate Overspecification. Quality is also enhanced to the degree that management attention is focused on priority requirements. Under the Defense Acquisition Improvement Program initiative 14, efforts have been underway to eliminate unnecessary, non-cost-effective requirements which serve to diffuse attention away from critical areas and to refocus attention on high priority contract requirements. The Services have already applied this initiative to a number of major programs, and have identified 12 programs for specification streamlining.

Quality Performance and Contract Awards. Direction already exists which seeks to ensure that contracts are not awarded to contractors with a history of providing supplies or services which were of unsatisfactory quality. What is needed is an effective mechanism to document quality history to aid in the source selection process. We are devoting efforts to develop an evaluation tool to meet our needs for improved source selection.

Improved Vendor Control. Many problems of poor quality and low

V. TACTICAL WARFARE PROGRAMS

This chapter presents the broad goals and objectives, achievements and management focus of our tactical warfare Research, Development and Acquisition Programs relating to our General Purpose Forces.

Soviet tactical warfare capabilities have steadily expanded over the last 30 years. They have invested substantially more than the U.S. in the development and procurement of increasingly capable tactical warfare systems. Soviet ground force divisions have been enlarged and equipped with the most modern tanks, artillery and helicopters. Their theater nuclear capability has undergone extensive modernization and expansion with the introduction of the improved SS-12 and new SS-20, -21, and -23 missiles. They have also recently enlarged their SCUD short range ballistic missile forces in East Germany. Soviet air forces are being modernized with high performance aircraft. Soviet air defense comprises a large variety of modern antiaircraft guns and surface-to-air missile systems. Soviet naval forces continue to receive larger and more lethal ships and submarines together with their weapons.

TACTICAL WARFARE GOALS/OBJECTIVES

The tactical warfare mission area programs are structured so as to modernize and fully equip our General Purpose Forces. This is essential in order to assure full and expedient achievement of our conventional force requirements and planning goals. As the initial priority, our General Purpose Forces must help deter premeditated aggression by denying potential aggressors confidence in their ability to achieve success by conventional means alone. Second, should deterrence fail, the General Purpose Forces should be capable of successfully forward-defending in Europe against a conventional attack without being forced to use nuclear weapons. Finally, these forces must be capable of sustaining a cohesive forward defense that will frustrate the success of additional attacks and cause cessation of aggression and withdrawal. Implementation of these conventional defensive planning goals requires the continuing assessment and prioritization of our programs against four principal objectives. These broad-based objectives are: (1) the achievement of a military posture in conventional forces that balances force structure, modernization, readiness and sustainability; (2) improvements to our defensive and retaliatory posture so as to deter attack; (3) the ability to exert a stabilizing influence in those areas of the world that are deemed of vital interest to the U.S. and our Allies; and (4) the development and acquisition of materiel capable of being effectively used in combat across the full spectrum of possible conflicts.

TACTICAL AIR WARFARE

U.S. tactical air forces are the tactical aviation of the Air Force, Navy and Marine Corps and the attack helicopters of the Army. The Soviets' tactical air forces

include Aviation of the Military Districts and Groups of Forces. Additionally, Soviet Naval Aviation, medium bombers in strategic aviation, and military transport aviation contribute to these capabilities.

The Soviets recently have reorganized their fighter aviation elements, merging the interceptors and tactical fighter/attack aircraft in most land areas on the Soviet border. This new centralized control of fighter type aircraft is expected to permit greater flexibility in the offensive and defensive orientation of the overall force structure. Gradual modernization of some former strategic defensive units with potentially multi-role aircraft (e.g., Flogger in place of Flagon) also suggests that Soviet tactical capabilities will be increased as a result of the reorganization. However, basing and training limitations will constrain the ability of the Soviets to allocate and effectively use interceptor forces in a theater campaign.

A summary of tactical aircraft produced from 1975 to 1984 is shown in Table V-1.

U.S. tactical aircraft production in the last decade has been substantially less than that of the USSR. A comparison of U.S./USSR tactical combat aircraft inventory value is shown in Figure V-1. Inventory value is the average unit procurement cost of aircraft in the combat units multiplied by the number of aircraft in the operational combat units.

Because of the procurement of more fixed wing aircraft and helicopters than the U.S., and the increasing capability of these aircraft, the Soviet tactical aircraft inventory value has increased much faster than that of the U.S. and appears to have exceeded that of the U.S. during the past decade Since TacAir is an area in which we expect to have an advantage, this trend is a matter of concern.

The Soviets have been experimenting with new air tactics over the last five years. They are developing training for a variety of new missions, including fighter escort, use of electronic countermeasures (ECM), maneuvering air combat, independent search missions and air accompaniment of ground forces.

Their new fighter aircraft, the MiG-29/Fulcrum and the SU-27/Flanker, are supersonic, all-weather counter-air fighters with look-down/shoot-down weapon systems and beyond-visual-range air-to-air missiles. These aircraft may have a secondary ground attack role. The Fulcrum in particular may have a true dual-role capability similar to that of the U.S. F-15E, F-16 and F/A-18. The MiG-29/Fulcrum became operational during 1984 and the SU-27/Flanker is expected to follow during 1985. The increasingly sophisticated nature of new Soviet aircraft apparently has delayed their initial production, but we anticipate large-scale series production of both in the immediate future.

Soviet air forces in the NATO central theater have by far the highest percentage of modern aircraft--over 90 percent of their inventory--because the Soviets perceive that this theater faces the strongest enemy and the most dense and complicated target array. The air assets in this region number about 3,000 aircraft and include every operational Soviet airframe except the Foxhound.

The Soviets have expanded their inventory and use of attack helicopters

Table V-1. PRODUCTION SUMMARY OF SELECTED TACTICAL AIRCRAFT FOR NATO AND WARSAW PACT COUNTRIES

CATEGORY	19[illegible]-1984 ANNUAL AVERAGE				1984				10-YEAR TREND	
	USSR	US	WP	NATO	USSR	US	WP	NATO	USSR	US
FIXED-WING COMBAT*	820	360	940	700	640	250	690	640	↓	↓
ROTARY WING										
Attack Helicopters	210	40	220	180	250	16	250	120	–	–
Other Military Helicopters	390	110	560	330	350	200	400	375	–	↑

*Includes all Interceptors.

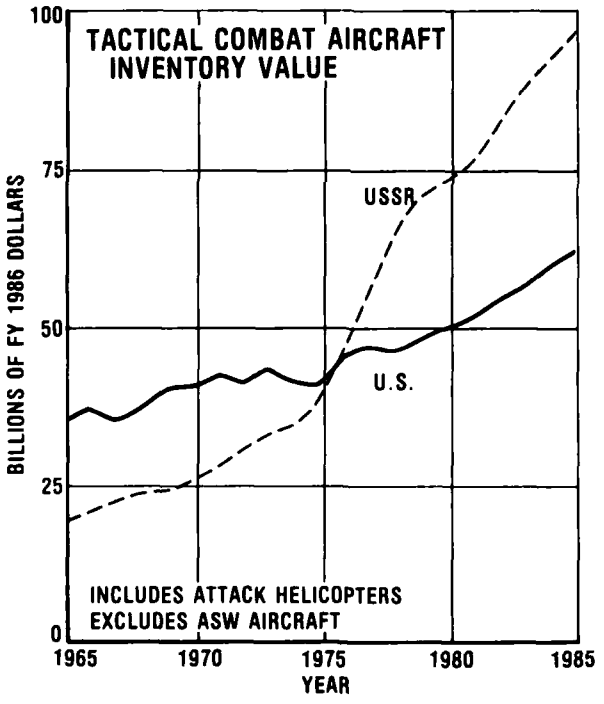


Figure V-1. A COMPARISON OF TACTICAL COMBAT AIRCRAFT INVENTORY VALUE OF THE U.S. AND USSR

with some assets being utilized by Air Defense Forces as low level interceptors.

Significant progress has been made during the last year in our efforts to upgrade the weapon systems of U.S. tactical air forces. Sufficient F/A-18 aircraft were acquired to permit the first operational Navy and Marine F/A-18 squadrons to be deployed last year. The fielding of the F-16 continued at economical production rates with the procurement of 144 aircraft. The F-16 program also realized the delivery of the first F-16C, under a production block change that yields F-16 fighters with enhanced avionics. The Department also initiated delivery of the F-16 to the Air Force Reserve and Air National Guard. With an eye to the future, the F-14D development effort was initiated which will upgrade the F-14 with new engines and a new radar. This upgrade will permit the F-14D to contend with the expected threat in the 1990-2000 time-frame. In 1984, we also started full scale development of the F-15E dual role fighter which will upgrade the night attack as well as the range/payload strike capability of our tactical air forces.

To complement our efforts on fighter aircraft, significant progress was made in the development and deployment of modern armaments for fighters. The Laser HELLFIRE missile successfully completed first production article acceptance testing. The Imaging Infrared MAVERICK successfully completed the initial series of operational effectiveness tests, and the Imaging Infrared guided GBU-15 bomb successfully completed development, test and evaluation. In the same period, the television guided GBU-15 successfully completed follow-on operational test and evaluation. Also continued during the past year was the production and deployment of the SPARROW, SIDEWINDER, and PHOENIX air-to-air missiles. The production and deployment of the High-Speed Anti-Radiation Missile (HARM) continued and progress toward more efficient production rates proceeded on schedule. Because of the more efficient production plans established in 1984 and other cost control measures, we achieved a 20.4 percent reduction in average unit procurement cost of the HARM.

NAVAL WARFARE

Measured by numbers of ships and procurement expenditures the United States and its allies maintain a favorable balance of maritime power. During the past 25 years, however, the Soviet Navy has conducted a significant, sustained modernization program that has steadily improved its combat capabilities. In fact, one of the dramatic military developments of the post-World War II period was the appearance of the Soviet Navy on the world's oceans beginning in the early 1960s. Previously, the Soviet fleet spent virtually all its time in port or in home waters, with poor levels of training. Although Soviet naval activity has increased markedly since then, we remain confident of the qualitative superiority of the U.S. fleet in training and material readiness for war.

The magnitude of the Soviet shipbuilding program is evident in Table V-2. They are producing about the same number of major surface combatants as the U.S., although they do not have the sea lane defense requirements of the U.S. Navy.

Figure V-2 compares major surface combatant inventory value. It shows the inventory value of Soviet major surface combatants has steadily increased for the past 20 years as a result of their persistent, sustained program. Figure V-3 compares the inventory value of attack submarines. It shows that the higher production rate of Soviet submarines has resulted in a steadily increasingly force of substantially greater inventory value than the U.S.

In the past two years, two new classes of nuclear powered attack submarines were launched by the Soviets--MIKE and SIERRA, and another new class has appeared in Pacific waters. The diversity of the Soviet submarine force is complemented by continuing production of the diesel-powered Kilo class attack submarine.

The Soviets have begun construction of a large aircraft carrier (60,000 tons displacement). As described last year, completion is expected at the end of the decade. The second nuclear-powered guided missile cruiser, *Frunze*, has joined the Northern Fleet and a third ship of the class continues under construction on building ways in Leningrad.

The Soviets have elected not to develop an underway replenishment ship force commensurate to an offensive surface role in the open oceans against major opposition, and their surface combatant force includes only a few ships (Kirov and Slava classes) with the new SA-N-6 anti-air area defense system. Accordingly, we continue to regard the attack submarine force and the long-range, missile-armed land-based bomber force as the principal threats to U.S. maritime forces.

Three important initiatives in our naval warfare mission area typify the progress made to improve overall maritime force capability. Concern for the defense of our overseas bases, forward deployed battle groups, and sea lanes against air and surface threats has led us to examine our ability to detect and track these threats over oceans and littorals vital to our maritime interests. Our evaluation shows we need surveillance sensors that can cover broad areas nearly simultaneously to fulfill our defense goals. Because such broad defense involves forces and systems that are multi-service and multi-national, DoD manages the effort through the Broad-area Surveillance Executive Committee (BSEC) chaired by the Principal Deputy Under Secretary of Defense for Research and Engineering. The BSEC has made recommendations to achieve the best balance among maritime surveillance programs such as over-the-horizon radars (OTHRs), conventional line-of-sight microwave radars, and spaced-based assets. Where appropriate, initiatives with allies have begun through BSEC auspices.

The second initiative involves Maritime Anti-Air Warfare Investment Planning. The Maritime Anti-Air Warfare Investment Planning Group was chartered by The Deputy Secretary of Defense to develop an investment strategy to effectively respond to the air threat to maritime forces. The investment strategy comprises a comprehensive review of both land and sea based forces in broad maritime regions, such as the Norwegian Sea, Mediterranean and Northwest Pacific. The Group has reviewed maritime anti-air warfare issues and has recommended a general plan for the development of naval

Table V-2. PRODUCTION SUMMARY OF NAVAL VESSELS FOR NATO AND WARSAW PACT COUNTRIES

CATEGORY	1975-1984 10-YEAR TOTAL				1984				10-YEAR TREND	
	USSR	US	WP	NATO	USSR	US	WP	NATO	USSR	US
Major Surface Combatants	90	85	107	192	7	8	10	17	--	--
Amphibious Ships	20	5	33	7	1	0	1	0	--	--
Attack Submarines	65	28	65	61	6	5	6	8	--	--

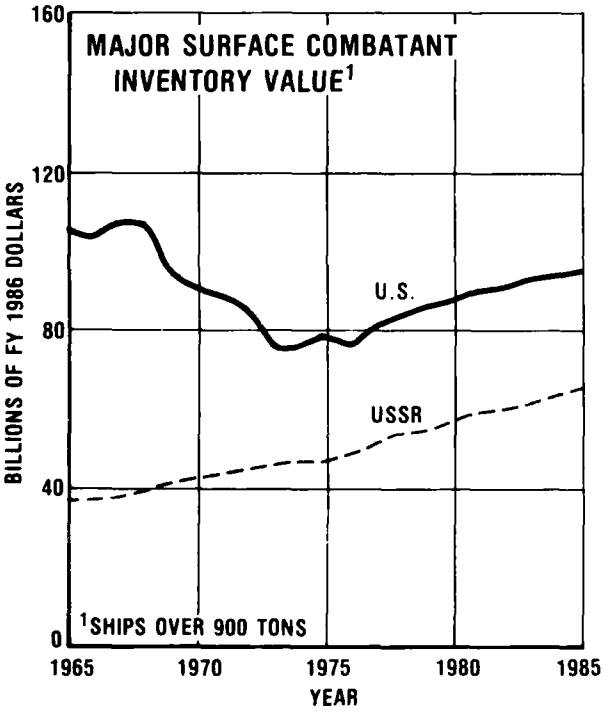


Figure V-2. A COMPARISON OF THE MAJOR SURFACE COMBATANT INVENTORY VALUE OF THE U.S. AND USSR

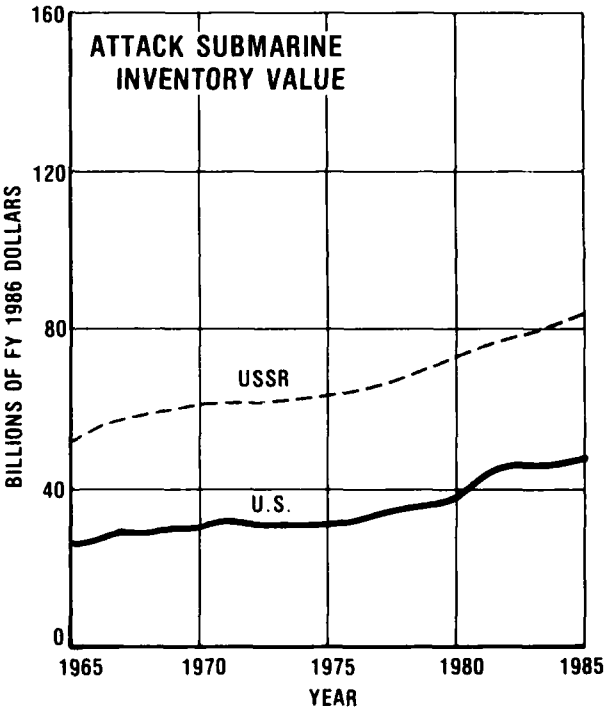


Figure V-3. A COMPARISON OF ATTACK SUBMARINE INVENTORY VALUE OF THE U.S. AND USSR

surface-to-air missiles that was presented to Congress by the Secretary of Defense in early 1984. The plan covers threat responsive items of interest to both Congress and the Services. In concert with the Services and the Unified Commands, the Group has outlined the elements most significant to a broad strategy for regional maritime air defense. The strategy would provide for a more effective defense of key land and sea assets in the vital maritime regions through the reinforcing combination of land-based and sea-based forces.

The third important initiative in the naval warfare mission area is concerned with the new class of submarines. In support of the new U.S. attack submarine, we are reviewing the Navy's analytical support of the ship's design characteristics in relation to its proposed missions. The ship's characteristics indicate that the submarine will represent a major step in retaining our qualitative edge in submarine and anti-submarine warfare.

LAND WARFARE

Since 1965 the Soviets have made steady quantitative and qualitative improvements in their ground forces. USSR investment in land force equipment has increased steadily for the past 20 years. The U.S., in the 10 years following the Vietnam War, reduced its land force procurement expenditures more than two-thirds, and only now have U.S. land force procurement expenditures returned to needed levels. As a result of erratic U.S. priorities and budgets for land force procurement, the Soviets appear to have spent roughly twice as much as the U.S. for land force procurement during the past ten years.

The quantities of major categories of land force weapons produced in this period are tabulated in Table V-3. The Soviet and WP advantage is substantial.

The Soviet tank force has been undergoing a major upgrade since the mid-1960s with the introduction of the T-62, T-64, T-72 and T-80 tanks. The T-80 tank features nuclear, biological and chemical protection and enhanced firepower and survivability. Also the Soviets are pursuing a comprehensive program of upgrading and expanding the artillery fire support available to ground forces. Several new artillery pieces, some of which are nuclear-capable, and new multiple rocket launchers have been introduced in the past few years.

Two accomplishments in the land warfare mission area are particularly noteworthy. The air defense of NATO Central Europe has received a heavy emphasis within this mission area during the past year. An historic agreement was concluded between the United States and the Federal Republic of Germany which will greatly strengthen the air defense posture in the NATO central region. The Memorandum of Understanding for Cooperative Measures for Enhancing Air Defense for Central Europe has as its purpose the enhancement of NATO Central region air defenses. There are two major parts to the agreement. The first is an arrangement in which the United States provides fourteen Patriot tactical fire-units to Germany. In return, Germany will operate twelve U.S. Patriot fire units for ten years. Further, Germany will operate for ten years 27 Roland air defense units at three USAF bases in Germany.

Table V-3. PRODUCTION SUMMARY OF SELECTED LAND FORCE SYSTEMS FOR NATO AND WARSAW PACT COUNTRIES

CATEGORY	1975-1984 ANNUAL AVERAGE				1984				10-YEAR TREND	
	USSR	US	WP	NATO	USSR	US	WP	NATO	USSR	US
Tanks	2200	640	2550	1100	3000	770	3300	1520	↑	↑
Other Armored Vehicles	4600	680	5460	1823	4200	1150	4575	2300	--	↑
Infantry Combat Vehicles	2900	150	3120	320	3600	600	3675	750	--	↑
ARTY, Mortars & Rocket Lchrs.* (100mm and over)	2100	150	2450	450	3300	260	3850	460	↑	↑
Anti-Aircraft Artillery	110	4	260	444	50	40	175	190	↓	↑

*Does not include direct fire weapons.

Germany will also fund agreed efforts to improve further NATO air defense. In addition, but not related to this agreement, Germany will purchase and operate an additional 68 Roland fire units to be deployed at German bases, some of which are USAF colocated bases. The second part of the agreement involves a German purchase, through Foreign Military Sales procedures, of an additional fourteen Patriot fire units. Included in the agreement is a provision for establishing a common logistics capability in NATO Europe to support the Patriot systems deployed in Germany. It is anticipated that logistics costs will be reduced and the combat readiness of the NATO deployed Patriots will be increased by implementing this common logistics system.

Another activity which was accomplished within our land warfare mission area involved the development of the initial version of the Antiarmor Master Plan. It is anticipated that this document will be updated periodically and thereby include new alternatives and options as technology and threat requirements evolve. Despite initial Congressional concern over the Antiarmor Master Plan, this document represents an important first step in a process whereby major antiarmor decision issues can be assessed in a coordinated and timely manner by the responsible components of the Department.

CONVENTIONAL INITIATIVES

New technologies now available can provide our air-land battle forces with radically new, major force multiplier systems for defeating armored attacks. We are developing systems to apply this technology that will be able to locate and track stationary and moving targets at distances of hundreds of kilometers. Intelligence and fire-control information from multiple sources will be processed by automated systems and distributed to tactical commanders for targeting decisions. Targets will be attacked by aircraft and ground launched missiles that deliver a variety of munitions, including terminally dispensed lethal submunitions.

Programs that emphasize extended-range target acquisition and deep-attack capabilities include the Joint Surveillance and Target Attack Radar System (Joint STARS), the Joint Tactical Fusion (JTF) Program, and the development of a family of tactical missile systems (JTACMs). Joint STARS is the airborne radar system being developed jointly by the Army and Air Force, which will be able to locate and track moving targets at extended ranges. Drawing on the information it provides, our forces will be able to use their weapon systems to strike targets throughout the battle area, including those deep behind enemy lines.

The Joint Tactical Fusion Program is a computer-based system which will process, analyze, and distribute intelligence reports obtained from multiple sources. This information will assist battlefield commanders in assessing the status and disposition of enemy forces and selected targets. We are developing a ground attack control center that will provide direct, real-time targeting data for battle execution.

The family of joint tactical missile systems, being developed by all the Services, will be able to dispense terminally guided and unguided submunitions at targets deep behind enemy lines. Corps equipped with JTACMS will be able to provide support to adjacent corps. It will exploit the long-range vision of our forces to direct attacks against enemy follow-on forces, air defense systems, command and control centers, and other interdiction and stand-off attack targets. The Joint Requirements and Management Board (JRMB), recently established by the DoD, contributed here by being able to develop Service consensus on a more focused development program for tactical stand-off missiles.

CONVENTIONAL MUNITIONS

During the past year we significantly increased the DoD thrust in modern conventional munitions through the Munitions Council. The Council, chaired by the USDRE, and comprised of the senior decision-makers from the OSD staff, the OJCS, and the Services, undertook the task of assessing the current munitions mix. As a result of Council deliberations, specific recommendations on ways to develop a more affordable and effective munitions mix were developed and presented to the Deputy Secretary of Defense. Emphasis was placed on enhancing our warfighting capability during the early days of a conventional conflict. A three part plan was developed that identified selected producible modern munitions for accelerated procurement; recommended specific product improvement programs for munitions currently in the inventory; and identified a number of R&D programs to build the basis for our next generation smart munitions. Subsequently, the Deputy Secretary of Defense has directed a number of budget actions in both munitions R&D and procurement that will significantly enhance force readiness and sustainability in the near term, and capitalize on our advanced munitions technology enabling a credible far term capability.

SPECIAL OPERATIONS

The significant accomplishments achieved in the special operations forces mission area include: continued

enhancement of infiltration/exfiltration capabilities through continuing upgrades of Combat Talon I and acquisition ofCombat Talon II aircraft; completion of studies which defined requirements for special operations peculiar equipment, such as secure communication equipment; and proceeding with development efforts for several highly specialized and unique systems such as the Swimmer Delivery Vehicle. In addition, we are continuing the program begun last year to develop and demonstrate technologies appropriate for use in low-intensity conflict.

MOBILITY

The mobility mission includes airlift, sealift and military port operations. The Soviet Union, for decades a continental military power, is developing an increasing capability to transport personnel, arms and equipment to any area of the world. Almost all of this is an airlift capability with some amphibious assault ships. No Soviet sealift force is known to exist as a separate entity from their large number of commercial ships. The Soviets depend primarily on the large USSR merchant fleet for strategic sealift. The U.S. with its many forces and obligations overseas and a need to reinforce and resupply them over great distances by sea and air has a greater requirement for mobility forces than the Soviet Union.

The objectives of DoD's mobility RD&A program are to provide sufficient assets (i.e., airlift, sealift, surface transportation, prepositioning, intermodal cargo transfer equipment, air refueling and supporting command, control and communications) to meet U.S. deployment and resupply objectives in a timely manner.

Progress has been made in quantifying our needs for the various mobility assets (e.g. the DoD Sealift Study) and further studies are underway (e.g. the Worldwide Intratheater Mobility Study). Many programs have been initiated to increase our mobility capabilities, and we are gradually closing the gap between our objectives and capabilities.

In intertheater airlift, for example, our capability will increase from 33 million ton-miles/day (MTM/D) at the end FY 1985 to 51 MTM/D by the FY 1990 funded delivery period, towards our goal of 66 MTM/D which will be met in the late 1990s. Major programs underway in airlift include: C-5A wing strengthening, procurement of 50 C-5Bs, Civil Reserve Air Fleet (CRAF) enhancement, full scale engineering development of the C-17A inter/intratheater airlifter and acquisition of 44 additional KC-10As (air refueling/cargo aircraft).

Sealift programs include expansion of the number of ships in the Ready Reserve Force, conversion of eight fast sealift ships to Roll-On Roll-Off configuration, and modification of container ships to be able to carry tracked vehicles, and other unit equipment.

Our prepositioning program includes the expansion of our Pre-positioning Of Materiel Configured in Unit Sets (POMCUS) to six division sets in Europe, development of prepositioning and staging base initiatives for Southwest Asia, and construction/conversion of Maritime Prepositioning Ships for three Marine amphibious brigades. A variety of acquisitions to improve unloading ships

and aircraft (e.g., TACS crane ships, floating causeways, and aircraft cargo handling equipment) are also underway.

In intratheater mobility we are acquiring additional line haul ground vehicles, and are increasing the wartime utilization rate of some of our C-130 aircraft by increasing spares procurement.

The Joint Deployment System, the Transportation Coordinator Automated Command and Control Information System and other computer based systems will enhance our capability to plan and execute deployments. Improvements in long range communications for airlift and sealift will permit greater control and survivability of these assets in wartime.

CHEMICAL WARFARE DETERRENCE

Goals

Our national goal is to eliminate the threat of chemical and biological warfare (CBW) by achieving a complete, verifiable ban on chemical weapons and by strengthening the verification and compliance provisions of existing agreements. Until our goal can be achieved, we are attempting to reestablish a credible military deterrent to chemical warfare. The following initiatives are being pursued:

- Equipping and training U.S. forces with protective systems to allow sustained operations in a CBW environment, while reducing the degradation in individual and unit performance imposed by protective systems and procedures.
- Supplying U.S. forces with the capabilities to treat casualties in an integrated nuclear, biological, chemical and conventional combat environment.
- Reestablishing the capability to retaliate effectively with chemical weapons to deny an aggressor a significant military advantage from CBW first use.
- Developing and implementing a program to safely demilitarize chemical munitions and agents.

Major Achievements

We continue to exercise leadership in Administration efforts to eliminate the threat of CBW through arms control and improved deterrence. We participated in the preparation and presentation of the U.S. Draft Convention on the Prohibition of Chemical Weapons at the Conference on Disarmament.

Significant progress continues to be made in CBW protection. This remains a thrust area in our technology base programs, especially in the efforts to improve medical protection. In FY 1986 we will further improve readiness by increasing stocks of protective items, and we are modernizing by acquiring improved items for all Services.

A second full scale chemical weapon demilitarization facility was approved by Congress for FY 1985. This facility, to be located at Johnston Atoll, will be for the disposal of obsolete, deteriorating chemical rockets initially, and other munitions in the future when additional equipment is authorized. The planning/approval process has been initiated for facilities to dispose of rockets stored at other locations.

Development of the BIGEYE binary chemical bomb is proceeding successfully, and developmental testing is to be completed in mid FY 1985, with operational testing to be completed in FY

. Development programs are
ıuing on a stand-off delivery system
vide a new force capability.

)octrinal improvements have been
or are underway in the chemical
:tion and employment areas. A Joint
ıical Test Project (JCHEM) has been
)lished to evaluate and improve
dures, and we are continuing to place
g emphasis on chemical warfare
:d training.

nt Objectives

'he FY 1986 chemical warfare
rence program would use more than
ercent of the funds requested of
ress to improve our CBW protective
)ilities. An additional 10 percent of
rogram funds will continue efforts to
y demilitarize chemical munitions
agents. The remaining funds,
ough relatively small would
ablish a critically needed credible
ıical retaliatory capability required to
ıre deterrence and provide an
ıtive for conclusion of an effective ban
emical weapons.

Recognizing the lack of agreement
n the nation on proceeding with our
ıical warfare retaliatory capabilities
:rnization, we are strongly supporting
'residential chemical warfare review
nission required by the FY 1985
)rization act. We are hopeful that this
ıission will provide the catalyst to
:ving a national consensus on this
ally important issue.

LLENGES AND OPPORTUNITIES

Looking to the future, the major goal
r efforts to improve tactical air power continues to be the maintenance of a capability to endure and achieve air superiority over any future area of operations. In view of the vigorous efforts the Soviet Union continues to make to deny us this capability for air superiority, the Department of Defense must work for steady improvement of our tactical air forces. This task can only be accomplished if adequate resources are planned and provided for many years to develop the improved systems that will be essential in the 1990s and beyond.

In naval warfare, perhaps the greatest technical challenge still lies in defeating air, surface, and submarine-launched missiles. It is important to counter the platforms prior to missile launch, in addition to having the capability to destroy the missile after launch. In so doing, it is necessary to develop naval tactics which combine land-and sea-based assets to counter the air threat to the fleet. The accomplishment of this task will require the maximum use of high technology and joint planning and testing in the areas of sensors, guidance, propulsion, counter-targeting electronic warfare, and a complementary hard kill/soft kill approach.

The challenges and opportunities which face the land warfare mission area include the establishment and promulgation of programs required to counter the Soviet's tactical ballistic missile (conventional, chemical, and nuclear) and decisive offensive chemicalwarfare advantage, and to provide capability to disrupt and curtail enemy airfield operations and to attack Warsaw Pact follow-on forces. Early disruption of operations at Warsaw Pact airbases would greatly reduce their ability to launch

:ained air attacks against NATO land
;ets. Hostile follow-on forces will be
:ctively attacked to ensure that
avorable force ratios do not result from
ition inflicted on NATO ground forces
he first echelon.

;ional incentives of jobs and ological futures to that of military

'.S. Congressional and support of pean parliaments to reverse ctionist policies" will be an essential ent in implementation of orative programs and competitive se acquisitions. The establishment of operative structure called for in the Glenn-Nunn Amendment has great tial to enhance the NATO nations ary and economic capabilities. nitment by all Services and the r participation by U.S. industries ose of our friends, allies and friends essary to exploit this opportunity. recommendations of the Defense e Board's reports on international stry-to-industry armaments ration with our allies identifies s needed.

NOLOGY TRANSFER AND EXPORT ROL

oals

he transfer and control of technology eparably related to International erative R&D efforts. DoD is ially concerned with those ologies essential for the development roduction of superior quality weapon ns. In fact, NATO's military strength een, and will continue to be, based such technologies. In sheer tities of military resources the aw Pact has us both outnumbered utgunned. We must, therefore, ce this numerical threat in large re by relying upon qualitatively or weapon systems to maintain our tive military strength.

It is clear that the sharing of our modern weapons technology with our allies is in our own national interest, if properly managed; but the loss by transfer to the Soviets is cause for grave concern. Based on our analysis, we see several important ways in which acquired technology has impacted on Soviet military capability:

- There is evidence that such technology has directly contributed to Soviet weapons systems (e.g., through reverse engineering or through direct use of products or know-how in weapon development programs). The contribution of Western micro-electronics is a clear example of this type of effect.
- Similarly, we have seen significant improvements in Soviet industrial productivity which have occurred through the use of acquired products and technology (e.g., robotics).
- Finally, our studies s[illegible]ignificant savings in Soviet defe[illegible]se resources and development time which have occurred through the exploitation of Western technology which we believe have been applied to other aspects of Soviet defense. Our estimates of such savings approach tens of billions of dollars in defense budget efforts. This defense savings has very high military leverage, particularly in their efforts for qualitative weapons improvements.

Major Accomplishments

The Militarily Critical Technologies List (MCTL) is a basic building block of our technology transfer control program. The MCTL is a detailed and structured technical statement of development, production and utilization technologies which DoD assesses to be crucial to given military capabilities and of significant value to potential adversaries. We have continued to refine and improve the list to

Israel conflict in Lebanon. This nge of information, as well as efforts levelop new systems, is expected to ue. Significant technology release s possible the Israeli development of tactical aircraft, the Lavi. We also several co-production programs with under the auspices of our Defense ction Assistance Agreement with country. We have amended this ment to provide for data exchanges, should further our cooperative s.

lur cooperative work with Asian ns is promising. In 1983 the ese decided to permit transfer of ary technology to the U.S. The se Science Board has completed an sment of the potential and means for ncing industry-to-industry arma- s cooperation with Japan. The DoD conducted an assessment of two al technological areas to determine e increased U.S.-Japan cooperation in selected areas might be in the al interest of the U.S. and Japan. Defense Policy Advisory Committee ade has assessed the perspectives of trade and defense. These efforts are nsure our overall program of ments cooperation is balanced and in national interest. Concurrently, real ress is evident in our armaments ration with the Republic of Korea, re programs in tanks, unications, and missiles are helping rengthen that country's defense bilities. The U.S. continues to support se modernization by the People's blic of China in a manner to fulfill our egic interests and which does not ten our own national security or that r allies and other friends in the Pacific region. Additional cooperative programs with Australia have been negotiated.

We are increasing our cooperation with countries of Southeast Asia. Agreement on procedures for pursuing a program of defense industrial cooperation was signed with Indonesia in the summer of 1984. We have signed an agreement on defense industrial cooperation with Pakistan. We are trying to identify projects of mutual interest with Indonesia and Singapore.

Cooperation with friendly countries in Latin America continues to improve in accordance with the needs and capabilities of the individual countries. A Memorandum of Understanding on military industrial cooperation, and an Air Force scientist and engineer exchange program, have been concluded with Brazil. We are also exploring with USCINCSO a regional cooperative program for the indigenous production of low technology materiel. In addition, we are arranging for exploratory discussions with Mexico on establishing long-term cooperative programs in military technology.

Challenges and Opportunities

It is imperative that we work with our allies and friendly governments to achieve commitment of increased resources and non-duplicative allocation of resources which will enhance conventional defense capabilities. Each must assume a more equitable share of the overall defense burden. Armaments cooperation programs are key to increased contributions to the common defense--as they provide the

ironment which fosters maximum use ombined technological and industrial abilities by working both within the TO Conference of National Armaments ectors (CNAD) and its main groups, as l as through individual bilateral and ltilateral agreements for specific elopment and production programs, by placing emphasis on utilizing the ad industrial infrastructure for peration which exists in international ustry-to-industry relationships.

This year we will insure responsive l sustained support for the NATO iative proposed by the Secretary of ense to exploit emerging technologies mprove NATO conventional defense. e emerging technologies initiative ises Alliance resources on priority grams that the NATO Defense isters have identified. These will vide improved conventional abilities within this decade in forward ense, attack of follow-on forces, counter- and C3I Counter C3.

The U.S. shares strategic and security cerns with other allies as well as ndly nations with whom we have no ance arrangements. We will expand peration with these non-NATO allies l friendly nations and will assist them developing and maintaining mutually eficial indigenous defense capabilities. will approve the sale of defense ipment, with appropriate safeguards cerning technology transfer, to those ions whose policies are in consonance h ours and those of our NATO allies.

Major Accomplishments

Our focus within NATO is the expansion of the broad infrastructure for cooperation as more industry-to-industry relationships are developed. The basic Multiple Launch Rocket System (MLRS) is an example of a U.S. system with European involvement in development and production. The four nation development of a terminal guidance warhead for the MLRS program, and the three nation development of a Rolling Airframe Missile (RAM) are examples of cooperative developments involving exchanges of advanced technologies. The AV-8B Harrier is an example of a European system with U.S. industrial team arrangements for co-production.

Significant improvements have been made in NATO's air defense coverage through multinational efforts in concert with the Congress. Agreements have been signed with Germany for acquisition, deployment, and support of the Patriot air defense system and Roland point defense of airfields. The Netherlands and the U.S. have entered into a similar arrangement for the purchase of Patriot. A Patriot agreement with Belgium is now being explored. These will result in enhanced effectiveness and interoperability in NATO's air defense. (See Chapter V, Land Warfare.)

We will continue our armaments cooperation activities with friendly Middle East nations. Cooperation with Israel, through the 1984 Memorandum of Agreement, has provided the Services with essential information learned during the

t beds for the information needed to ke major platform acquisition decisions. e challenge we face is how to conduct listic testing using these test beds. We evaluating alternatives for more ective utilization of land based test beds. erconnection and interoperation of graphically dispersed simulations and t beds is one of several potential utions being explored.

Foreign Weapons Evaluation WE) Program: The FWE program is uctured to evaluate weapon systems, ipment, and technology from friendly eign nations for use by our forces and velopment agencies. The program has itinued to produce results with the ection of five more foreign systems for S. forces use in the past year. Since its eption in FY 1980, the program has sulted in 18 items of equipment being ected by the Services for U.S. inventory th a procurement value of nearly $1 lion. This figure is based on an annual erage investment of less than $10 llion per year. By capitalizing on the search and development efforts of our ies, we have been able to obtain $20 of ocurement value for every test dollar vested. This compares to a return of .20 in procurement value for every DT&E dollar invested in domestic ograms. This successful program, with added features of increased eroperability and standardization with r allies, is building visible milestones ng the two way street of international peration.

INTERNATIONAL ARMAMENTS COOPERATION PROGRAMS

Goals

The basic goal of our international cooperation and technology transfer programs is to develop, field and support--through equitable burden sharing--the most effective and interoperable conventional military equipment for our forces and those of our allies and friends. This requires joint efforts and the exchange of military technologies and goods, when in our national interests to do so, and the denial of militarily critical technologies and goods to our potential adversaries.

We cooperate with our NATO allies in the interchange of technology through cooperative research, development and acquisition of weapon systems. It is our objective that the NATO Alliance attain, through equitable burden-sharing, the necessary military strength in terms of superior weapons, readiness, sustainability, and interoperability to achieve and maintain a credible military deterrent and thus preserve peace.

Specific Objectives

A credible collective non-nuclear forces capability within NATO will require substantial investment by the U.S. and Allied governments. Armaments cooperation is a key incentive to economically achieve these investments. Thus, our objective is to create an

ablished and is being expanded to vide the joint test community a iprehensive up-to-date reference base. : management and organization of joint :s have been formalized and improved.

Aerial Target Initiatives: velopment has begun on a supersonic -altitude aerial target to replicate the h speed, low-altitude dash of anti-ship isiles. Initial Operational Capability C) for this new test resource is FY 1990. the interim, modified Vandal targets l provide a surrogate of the anti-ship isiles threat. A new low cost subscale, isonic target, the BQM-PI, is under tract with an FY 1988 IOC. The BQM- will supplant older, costlier systems and vide engagement scenarios to stress 3. counter-air systems under test. A earch and development effort will result a new full scale Army helicopter aerial get, vitally needed to test battlefield air ense systems. IOC for this target is FY 37.

Test Range Modification igram: The modernization program tinues to provide a significant increase the test and evaluation resources ailable at our test ranges. These ources will support all phases of velopmental T&E (DT&E) and erational T&E (OT&E). For example, Army's High Energy Laser Systems st Facility (HELSTF) and the Air ce's Radar Target Scattering Advanced asurement System (RAMS) will reach C in 1985 to support vitally needed hnology developments. The Navy has iduced a comprehensive study of T&E underwater range requirements rldwide which will insure that thcoming submarine and anti- marine warfare systems will be fully tested and evaluated to insure their effectiveness. These resources and other new facilities under contract for the T&E ranges will allow us to meet the challenges and satisfy the requirements of timely and comprehensive weapon systems test and evaluation.

Challenges and Opportunities

Service Preparation of TEMPs: The quality of Service Test and Evaluation Master Plans (TEMPs) has improved, but continued emphasis is required to insure completion of essential tests. TEMPs must critically examine all technical and operational testing issues before a major system can be fielded with confidence, and must provide a clear correlation between these issues and program objectives on the one hand and test-verifiable goals and thresholds and risk levels on the other. We have asked the Services to continue the improving trend of timeliness and quality in the TEMPs they submit, particularly in quantifying system parameters to be verified by testing. In addition, we have made mandatory the Services' early identification of test resource requirements and shortfalls, and inclusion of plans to correct existing or expected resource shortfalls. As a result of a special project to develop improved guidelines for T&E software, increased emphasis is also being given to plans for testing embedded or mission critical computer software.

Ship Testing: The long construction periods associated with ships make it impractical to wait for test results from the first production article before deciding on production configuration of follow-on ships. Consequently, we must rely heavily on land based and sea based

acquisition, surveillance and electronic warfare.

TEST AND EVALUATION (T&E)

Goals

The Director, Defense Test and Evaluation approves test planning and oversees the execution and evaluation of major weapon system testing throughout the acquisition process. Most importantly, he provides critical independent assessments of these systems to the Secretary of Defense and the Defense Systems Acquisition Review Council at major decision milestones. In addition, he oversees the management of the DoD major range and test facilities, joint service tests and evaluations, and the DoD Foreign Weapons Evaluation Program.

Major Achievements

Threat Simulator Developments: To achieve economy, preclude unwarranted duplication and gain emphasis from a coordinated effort, we have developed a tri-Service program within the purview of the Joint Executive Committee on Air Defense Threat Simulators. We now have efforts underway to generate a data base for use in simulating threat air defense systems. An Integrated Program Plan has been developed to link scientific and technical intelligence acquisition, surrogate testing, and simulator developments and to analyze requirements for realistic operational testing. A Threat Simulator Master Plan (TSMP) has also been produced to catalog current inventories and shortfalls for threat simulators. This data base has been automated for more timely data collection and report production.

International Test and Evaluation Initiatives: Under the T&E agreement secured with Canada last year, an Air Launched Cruise Missile (ALCM) captive-carry test was successfully completed in March of 1984. With recently modified test support instrumentation we will be continuing the annual ALCM operational test flights in Canada this winter. The 1985 series of tests will consist of one B-52/ALCM captive-carry test plus two ALCM free flights over western Canada where the terrain closely resembles the Eurasian land mass. Additionally, test plans were approved by both governments and testing completed on the Air Force's LANTIRN system and the Navy's F/A-18 and AV-8B aircraft during the Fall of 1984. The Canadian/U.S. agreement affords the Department of Defense an inexpensive way of testing weapon systems and equipments under realistic battlefield conditions.

We are entering into cooperative agreements with several countries (e.g., Peoples Republic of China, France and the United Kingdom) to assist them in improving and modernizing their testing capabilities. We expect these to be a long term effort as we develop plans to upgrade their test facilities.

Joint Test and Evaluation (JT&E) Program: The JT&E program includes five ongoing tests in FY 1986 to examine the capability of developmental and deployed systems to perform their intended missions in a joint environment: Command, Control and Communications Countermeasures; Electro-Optical Guided Weapons Countermeasures Counter/Countermeasures; Identification Friend, Foe or Neutral; Forward Area Air Defense; and Joint Live Fire test on foreign and domestic armor. A Joint Test and Evaluation Library has been

advances in microcomputers, educational aids, and video reproduction, as well as capitalizing on the inherent interest of electronic "games" as trainers, we are matching individual skills with job demands and developing new skills and technologies where required. We intend to capitalize on the 20%-50% saving in cost and 30% saving in time that our research shows can be realized through the use of computer-aided and computer-managed simulators and other training devices. We will do this through the use of high speed computers, solid state displays, mass storage of information and other advanced training techniques. Our goal is to make learning effective and the training process cost- effective.

Basic Research

Our basic research is the source of new ideas and new science that underpins technological developments vital for sustaining superior technology. Much of this work is performed by universities. Initiatives such as the DoD-University Forum and the University Research Instrumentation Program are increasing collaboration between DoD and university researchers. Essential components linking academic and industrial research to DoD applications are the DoD laboratories. We are proposing to provide funding for new research initiatives to foster stronger interactions between DoD laboratories and Universities and to provide a sounder basis for the development of technological options to solve National Security problems.

One important element of the research program enables DoD's in-house laboratory directors to have more latitude in selecting technology areas they regard as particularly timely in advancing our capability. Among our goals is to attract, retain and motivate highly qualified scientists, engineers and technicians throughout DoD and especially in the laboratories in order to enhance the capability of the Department to fulfill its mission.

Other Areas

Progress is also being made in many other areas. We have initiated a DoD/NASA program to develop metal-matrix composite survivable space structures. This long range science and technology program will undertake to demonstrate options that will withstand nuclear, laser, and pellet attack.

The Navy and Air Force Joint Technology Demonstrator Engine program has recently demonstrated significant performance improvements in large experimental fighter engine configurations which will be the foundation for a new Joint Advanced Fighter Engine (JAFE) for the next-generation air superiority fighter. Our goal for FY 1986 is to complete life cycle assessments of those advanced technologies to insure that the JAFE can avoid durability problems and performance compromises that have plagued previous fighter engine developments.

We have achieved considerable capability in denying our adversaries the ability to exploit the electromagnetic spectrum for weapon guidance and C^3 operations. With the emergence of wide-band gallium arsenide components, we are placing less emphasis on stand alone techniques by developing integrated systems to perform the functions of target

significant reduction in the cost of computer time. Related to STARS is the expanded use of the new DoD standard programming language, Ada, which has shown promising results in its early applications. Also, with the establishment of the Software Engineering Institute in December 1984, we have taken a major step in our effort to accelerate the transition of emerging software technology into use in defense systems.

In addition, substantial progress has been made in the management of our mission critical computer resources. The Defense Computer Resources Board and the Computer Research Council were established to address computer policy and management of mission critical computer systems. These actions will serve to strengthen the DoD computer and software posture in future years.

Supercomputers

The Defense Advanced Research Projects Agency (DARPA) Strategic Computing Program is developing a class of super intelligent computers for application to advanced defense systems by the end of the decade. Emphasis in the program is on machine vision, natural language understanding, speech understanding and the development of expert systems. Small scale, non real-time laboratory feasibility demonstrations of these capabilities have been achieved in the basic research program. The Strategic Computing Program is developing the computational speed necessary for defense applications. An estimated three to four orders of magnitude increase in speed is needed over conventional machines and will be achieved by the use of advanced microelectronics and multi-processor computer architectures. These capabilities will be applied in various high payoff defense programs including an autonomous land vehicle, an electronic co-pilot called a pilot's associate and a battle management system.

Cruise Missile Technology

Also, DARPA's Advanced Cruise Missile Technology program has achieved major successes in the areas of autonomous terminal homing accuracy (extremely low target errors for cruise missiles), and in advanced propulsion. In the latter area a gas turbine rotor built entirely of advanced carbon-carbon materials has advanced through dynamic spin tests which validated structural integrity. Exotic metallic slurry fuels have also been tested at very high efficiencies. Over the next several years full scale carbon-carbon hot section components will be fabricated and tested in a turbine hot section demonstrator. The successful culmination of these demonstration programs will result in more than a twofold extension of cruise missile range-payload. Other applications of this technology include virtually all manned and unmanned vehicles using gas turbines.

Training Technology

We are placing added emphasis on methods and equipment to train our active and reserve forces to meet the challenge of enhanced readiness while limiting costs. Available technologies are being refined, and new technologies are being developed to insure that people can effectively operate and maintain new systems. Using

space by an enemy. I am confident that this program will continue the augmentation of our military forces that is proving to be an increasingly important aspect of the strategic balance.

SCIENCE AND TECHNOLOGY PROGRAM

Among our assets to deter the Soviet's numerically greater and increasingly sophisticated forces is a large and viable national science and technology (S&T) infrastructure capable of producing new and innovative solutions to defense problems. The Department of Defense in-house laboratories, the universities and industry all play major roles in ensuring that technology appropriate to defense is anticipated and developed in a timely manner and transitioned into useful military applications at the earliest practical date. It is important to take advantage of the leverage afforded by this DoD-private sector cooperation to ensure that we have a strong and viable technology base for future weapons. This is an area of advantage for us that we must maintain.

The S&T Program is managed by the Services and Defense Agencies and covers technical areas of importance to the military mission. The range of projects varies from basic research to large scale demonstrations. It is not practical to describe all S&T efforts in this section; however, several important programs will be highlighted.

Very High Speed Integrated Circuits (VHSIC)

The Very High Speed Integrated Circuits (VHSIC) Program has made excellent progress toward the goals of increasing the U.S. lead in integrated circuit technology deployed in weapon systems and minimizing the time delay before technology deployment. Each of the six VHSIC contractors has produced fully functional devices and has programs to improve their fabrication yields; together they have produced over 2,000 fully functional VHSIC chips. The insertion of VHSIC into an operational system will occur this year, the first of 37 weapons system programs for which the insertion of VHSIC technology has been initiated. Contracts have been awarded for development of the critical second generation (submicrometer) of VHSIC. During this year and the next we will be capitalizing on the first generation technology and using the experience gained to guide aggressive development of the second generation. VHSIC remains our highest priority technology program and we will continue to provide strong management emphasis to achieve the expected increases in military capability that will result.

Computers and Software

A number of activities are underway in computer and software technologies. The Software Technology for Adaptable, Reliable Systems (STARS) program is proceeding with a goal to achieve at least a ten-fold improvement in DoD's ability to develop computer software to meet mission requirements. This joint Service program will be accomplished by the increased use of computer-aided-techniques for software development, the use of reusable software libraries to avoid redevelopment, and computer program construction tools which are now affordable due to a

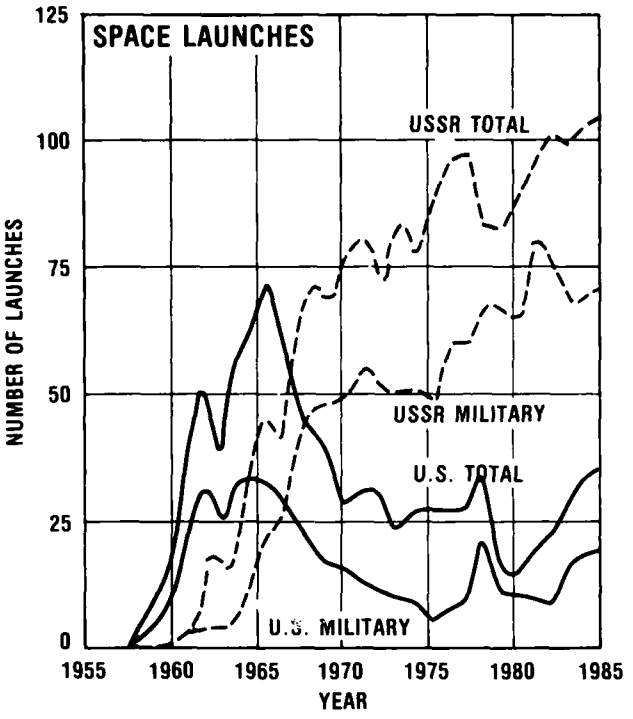


Figure VI-1. ANNUAL NUMBER OF U.S. AND USSR SPACE PROGRAM LAUNCHES

and to their longer production runs which reduce unit costs.

The Soviets have three extensive space assembly and launch complexes which are located at Tyuratam, Plesetsk, and Kapustin Yar. Major new launch and support facilities are nearing completion at Tyuratam for a family of new space launch vehicles and reusable spacecraft. Operational capabilities for these new facilities and systems will probably be achieved by the late 1980s to early 1990s. The U.S. Space Transportation System (STS or "Space Shuttle") and its launch facilities are comparable developments now largely operational.

The Soviet heavy lift launch vehicle is estimated to have a payload capability to low orbit of up to 330,000 pounds, far exceeding their prior launch capability maximum of 44,000 pounds and in the same class as the discontinued U.S. Saturn. The U.S. STS can place 65,000 pounds of payload into low earth orbit.

The U.S. objectives in space outlined in the President's National Space Policy call for a balanced civilian and national security space program. Defense efforts focus on four major areas:

- Pursuing a vigorous research and development program to capitalize on space technology as it evolves;
- Moving to space those support functions best performed there;
- Ensuring that we can maintain access to space; protecting our resources deployed there; and
- Developing the capability to defend against threatening enemy space systems.

Because the Shuttle is essentially a peacetime system, we are initiating a program to procure ELVs for an assured access to space and to sustain our invaluable launch vehicle industrial base developed over the last 25 years. One of our highest priorities is preserving the vigor of our space programs designed to implement the national security aspects of the President's National Space Policy. The continuity in this program protects our vital industrial base which is fundamental to maintaining our technological lead, ensuring access to space and space support to our forces when it is necessary, and making it possible to protect our ground forces against adverse employment of

planning, highlight Defense-Wide Intelligence activities in FY 1984.

We are rapidly upgrading our support to the theater commands through the fielding of new or improved intelligence support systems. For example, the TR-1 aircraft with appropriate sensor suites is being fielded. Also, the Improved Guardrail V and Trailblazer systems are being fielded with Army units which will significantly enhance their signal intelligence support capabilities.

In the area of intelligence training we have actively pursued improvements to the Defense Language Institute, the Navy-Marine Corps Intelligence Training Center and various Army and Air Force facilities for training of the operation and maintenance personnel associated with our intelligence activities.

Challenges and Opportunities

We must take full advantage of the close working relationship between our weapon system project managers and C3I systems managers to ensure that C3I performance is considered early in the conceptual phase of new weapons developments. To accomplish this we must:

- Provide overall architectures and planning information to allow for the integration of new force management concepts without totally redoing existing C3I assets.
- Strengthen C3I management through the use of such joint and defense-wide activities as the new Joint Tactical C3 Agency.
- Improve our capabilities to degrade enemy weapon effectiveness and C3 systems while ensuring that the enemy is denied the opportunity to easily degrade our force management apparatus.
- Always be aware that the performance of our C3I systems is satisfactory only when our commanders' critical requirements are fully met.

SPACE

The Soviet Union has a large, dynamic, and expanding space program now launching over 100 space boosters per year. Soviet activities in space indicate that they emphasize the military objectives of providing maximum support to the military forces and the ability to deny use of space to an enemy. Lesser emphasis is attached to purely civilian aspects which account for roughly 15 percent of their total launches. The larger size of the Soviet program and its greater emphasis on military activities compared with that of the U.S. is displayed in Figure VI-1.

The Soviets do not now admit that they have any military space systems. Broad foreign reporting refutes this contention with, for example, the extensive documentation on continued Soviet operational testing of a ground-based orbital homing satellite interceptor since at least 1971. The U.S. maintains nearly the same number of active satellites on orbit, approximately 110 to 120, as does the Soviet Union. However, by virtue of longer satellite orbital lifetimes, the U.S. is able to do so with significantly fewer launches. Despite the four times greater launch rate and total annual payload to orbit, Soviet estimated space program cost is estimated to be roughly twice that of the U.S. The lower Soviet unit cost is primarily due to their use of less sophisticated spacecraft

Contracts for the Communications Nodal Control Element and the Tactical Digital Facsimile also were awarded.

Defense-Wide Communications and Information Systems

In September 1984, the Defense Data Network completed physical separation of the existing ARPANET into an unclassified Military Network and an experimental network. The Inter-Service/Agency Automated Message Processing Exchange program for the replacement of message processing facilities at the base, post, camp and station level received vendor proposals in October 1984 with an anticipated multi-vendor contract award targeted for mid 1985. The Blacker end-to-end encryption program will also be in its major development phases from FY 1985 through FY 1987.

The World-Wide Military Command and Control System Information System will provide increased crisis management capability to the National Command Authorities. Two major contracts were structured and awarded so that near term technical and functional enhancements would be provided to the users immediately.

The NORAD modernization activities have included development efforts for the communications segment, testing of the initial equipment to support the Space Defense Operations Center, and the initiation of replacement activities for the processing and display system.

The first LEASAT leased communications satellite was launched during August 1984, is on station over the US and is meeting all operational goals. The second was launched in November 1984. Two additional LEASATs are scheduled for launch during FY 1985. The first Defense Satellite Communications System (DSCS) anti-jam network, using the latest technology DSCS III satellite, was activated during FY 1984 and is undergoing final testing. The new DSCS III satellites will support the Jam Resistant Secure Communications requirements in addition to other high priority command and control user needs. The DSCS III satellite multiyear procurement contract was awarded in November 1984 providing substantial savings over an annual procurement.

Electronic Warfare and C^3 Countermeasures

Major strides during FY 1984 included the first delivery of an engineering development model of the jointly developed (Air Force/Navy) Airborne Self-Protection Jammer. The EA-6B aircraft buy was increased from six to eight and its Advanced Capability enhancements entered Full Scale Development, as did the Navy's Communications Jammer, AN/ALQ- 149. A Memorandum of Agreement has been established between the Navy and Air Force for Radar Warning Receivers and Integrated Electronic Warfare Systems. These are necessary first steps to ensure our future developments in both these areas are economical and interoperable.

Defense-Wide Intelligence

Significant advancements in intelligence support to our military forces to meet our worldwide commitments, along with an expanded role for integrated

DSARC III decision (production) point scheduled for early FY 1986.

Theater and Tactical C^3

We continue to implement our tactical anti-jam communications architecture plan which was delivered to the Congress during FY 1983. Initial deliveries of Air Force and Army Class 2 Joint Tactical Information Distribution System (JTIDS) full scale development terminals began in March 1984. Formal development and operational testing is scheduled for FY 1985 with initial procurement in FY 1987. This will allow us to meet the goal of fielding JTIDS in all four Services by 1989. We continue also to work toward the adoption of JTIDS as the basis for the NATO Multifunctional Information Distribution System. A DSARC level review held in June 1984 directed that additional interoperability modes between the Enhanced JTIDS System (EJS) and JTIDS be implemented, and design tasks necessary to accomplish this were begun. The deployment goal for EJS is to commence fielding in the Air Force in 1989.

As a key part of our tactical anti-jam communications architecture, we continue to field radios modified to provide a near-term jam resistant operational capability (HAVE QUICK). We are also continuing to develop improvements to the HAVE QUICK system to extend its useful life. These initial improvements will be fielded during FY 1986. During early FY 1985, HAVE QUICK also became the first ECCM system to obtain frequency support in NATO Europe. It will provide a significant operational capability into the 1990s, including interoperability with our allies who have already committed (or will commit in the future) to buying HAVE QUICK.

During FY 1984, major advances were made in the Mark XV portion of the Combat Identification System. The requirements for the system were firmly established by a Multi-command Required Operational Capability for the Next-Generation Question and Answer Identification Friend-or-Foe System, which was endorsed by all commanders-in-chief (CINCs), Services and Agencies. Here again, the recently chartered JRMB was able to expedite Service agreement (June 1984) to proceed to the next Mark XV program phase. A major program milestone was achieved when a DSARC I (Demonstration & Validation) review of the Mark XV was held in July 1984. As a result, the Secretary of Defense directed the Services to proceed into the next phase of development on an accelerated basis, to achieve DSARC II (Full Scale Development approval) and begin Full Scale Development in 1987. NATO interoperability is also being pursued on a Quadrilateral basis (US/UK/GE/FR), with the UK and France already expressing a willingness to accept the US proposed compromise.

To provide improved communications for the land forces, we have contracted for the Single Channel Ground/Airborne Radio System (SINCGARS) for fielding starting in FY 1986. We have initiated the procurement of the Mobile Subscriber Equipment by proposing the acquisition of proven, off-the-shelf equipment. During FY 1984 we received the final large tactical message switch (AN/TYC-39). The procurement of the complementary large circuit switch (AN/TTC-39) is about 50 percent complete.

VI. DEFENSE-WIDE INITIATIVES

In this chapter the achievements, objectives, and accomplishments of the remainder of the major Research, Development and Acquisition Program are discussed. Specific programmatic detail (cost, quantity, schedule) is available in the descriptive summaries provided separately.

COMMAND, CONTROL, COMMUNICATIONS AND INTELLIGENCE (C^3I)

Goals/Objectives

Within the C^3I mission area our goal is to support the entire range of military missions. C^3I systems must enhance the inherent deterrent capabilities of both the offensive and defensive strategic forces. They must provide our commanders, at all echelons, with accurate, timely and credible information, provide a means to process, display and evaluate data and, of course, provide our commanders with the capabilities to transmit orders and decisions to our forces and weapon systems. Those non-nuclear C^3I systems that are of special importance to OSD perform functions necessary to carry out cross-Service, joint-Service and warfare missions in conjunction with our allies. Hence, our overriding objective here is to ensure that systems planning, architectural development and the need for program stability are considered by the Military Departments and Agencies.

While we still need to ensure that our C^3I assets function throughout all stages of conflict, we also must deny our adversaries the benefits they gain by disrupting our C^3I systems and by using their own capabilities with impunity. Thus, the C^3I mission area goals also include the development of effective electronic warfare and C^3 countermeasure systems.

Major Achievements

Strategic and Non-Strategic Nuclear Forces

Our major achievements in support of President Reagan's modernization program for strategic C^3 are described within the strategic forces section of this report. In addition, during FY 1984 the Army awarded the Regency Net contract to update the communications connectivity for non-strategic nuclear forces in Europe.

The last of the 34 Airborne Warning and Control System (E-3A) aircraft was delivered to the Air Force in June 1984. In addition to these, 16 of the 18 aircraft on order for NATO were delivered by the end of CY 1984. These aircraft have added a significant air surveillance and command and control capability for U.S. and allied forces and have been deployed to trouble spots throughout the world. During FY 1984 two additional research and development satellites were placed into orbit to support user equipment testing for the Global Positioning System. The initial operational test and evaluation for this equipment started late in FY 1984 with a

remove outdated elements of technology. For the first time, we have published and released to the general public an unclassified version. Industry has been a significant contributor to the MCTL's evolution, both as members of the Technical Working Groups and in the review of the MCTL by the Multi-Association Policy Advisory Group (MAPAG).

The International Coordinating Committee (COCOM)--comprising representatives from Japan and the NATO countries, except Iceland and Spain, has refined its agreed list of restricted items to control the transfer of products and technology to the Warsaw Pact. DoD has been a major contributor to this effort, preparing well over a hundred technical proposals to be used in the COCOM list review. We have also provided a major portion of the technical support at the negotiating table. Our efforts in this area have been very successful inasmuch as COCOM has accepted our recommendations to provide new coverage in many areas that were previously uncontrolled. Significant among these are several revisions to the International List in the area of computers. These have eliminated many obsolete controls while concentrating control on areas that have a high military value.

The International Technology Transfer Panel has been established within DoD to better determine disposition of proposed transfers of sensitive technology. This group is concerned with military technology, strategic trade and general national security issues relating to technology transfer.

The DoD has long recognized the need to rewrite the Technical Data Regulations (administered by the Department of Commerce) in order to improve the control of critical technology identified in the MCTL. While the regulations control direct technology transfers to potential adversaries, there is a considerable potential for diversion through third countries. While existing regulations are clearly inadequate to protect our critical technology, we recognize that more stringent controls would impose an additional burden on US exporters. We have continued to work closely with the Department of Commerce to tighten certain technical data transfers to all destinations while reducing controls on products. When implemented, these initiatives will lead to tighter controls in critical technology exports to all destinations, but decrease controls in the export of noncritical technology to many destinations.

Perhaps most important to industry is the time required by government agencies to process export license requests. The DoD program in export control and technology transfer has improved our operating policies and procedures so that export license applications are now being processed more expeditiously, consistently, and systematically. To effectively focus and coordinate our export license review process, the primary functions of OUSDP and OUSDRE involved in munitions and strategic trade licensing have been colocated to facilitate rapid and accurate policy and technical review.

In addition to interacting closely with industry on specific export cases, we are also working to improve industry's understanding of critical technology issues. The Defense Policy Advisory Committee on Trade, the Defense Science Board, the American Defense Preparedness Association, and the DoD University Forum are good examples of the fora we have used to discuss and clarify technology transfer issues.

APPENDIX A

OVERVIEW OF RESEARCH, DEVELOPMENT & ACQUISITION BUDGET

A-2 Appropriation Categories As a Percentage of the Defense Budget

A-3 RDT&E by Component

A-4 Procurement by Component

A-5 RDT&E by Budget Activity

A-6 RDT&E by R&D Category

A-7 RDT&E by Performer

A-8 RDT&E by Defense Programs

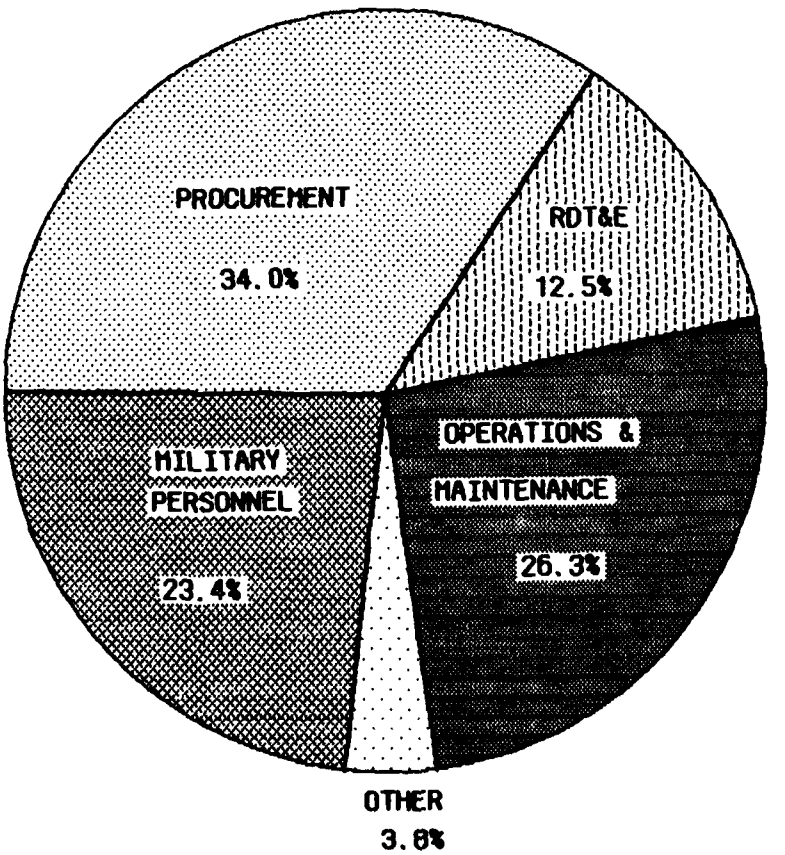
A-9 Procurement by Appropriation

APPROPRIATION CATEGORIES AS A PERCENTAGE OF THE DEFENSE BUDGET

BUDGET AUTHORITY ($ BILLIONS)

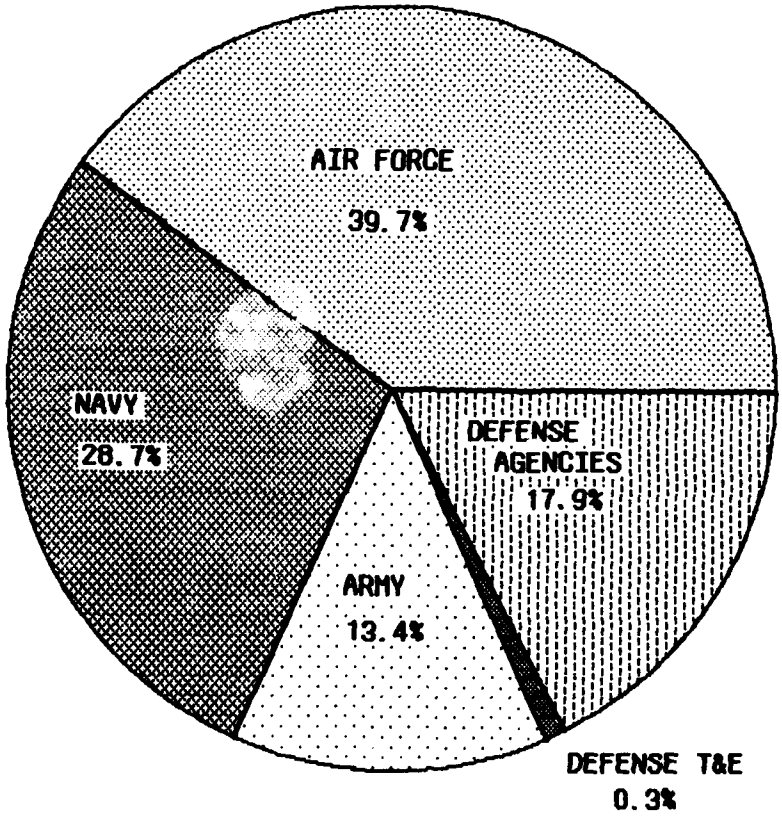
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Mil Personnel	64.9	25.1	68.9	24.2	73.4	23.4
Oper & Maint	71.0	27.5	78.2	27.5	82.5	26.3
Procurement	86.2	33.4	96.8	34.0	106.8	34.0
RDT&E	26.9	10.4	31.5	11.1	39.3	12.5
Mil Con	4.5	1.7	5.5	1.9	7.1	2.3
Family Housing	2.7	1.1	2.9	1.0	3.3	1.1
Other	2.1	0.8	0.9	0.3	1.4	0.4
TOTAL DOD	258.2	100.0	284.7	100.0	313.7	100.0



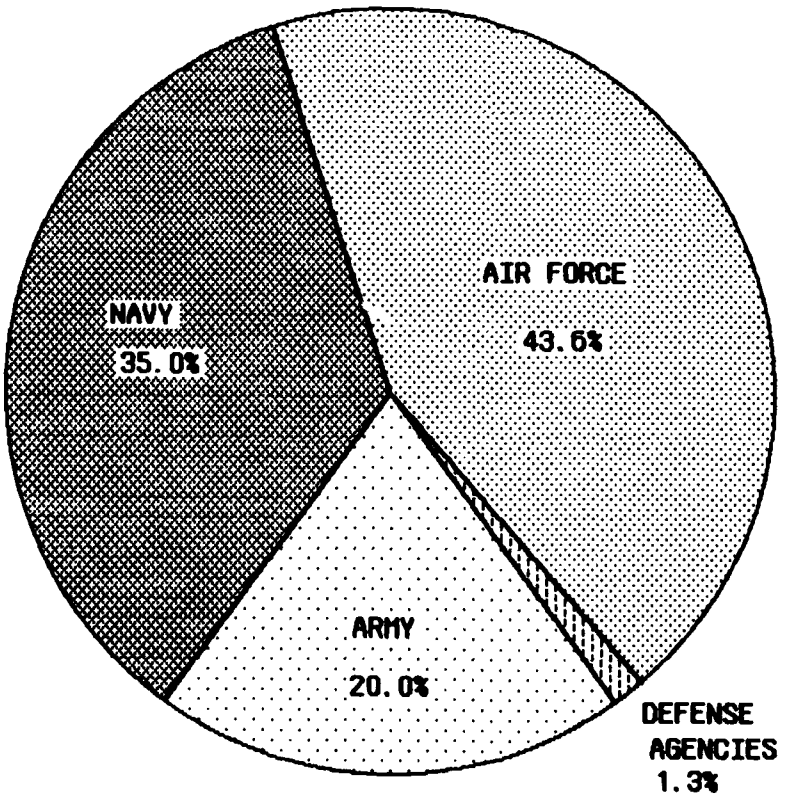
RDT&E BY COMPONENT
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Army	4,215.4	15.6	4,376.1	13.9	5,279.9	13.4
Navy	7,629.4	28.3	9,274.1	29.5	11,264.3	28.7
Air Force	12,275.2	45.6	13,506.3	42.9	15,578.5	39.7
Def Agencies	2,769.4	10.3	4,236.3	13.5	7,053.9	17.9
Def T&E	49.0	0.2	59.0	0.2	103.5	0.3
Total RDT&E	26,938.4	100.0	31,451.8	100.0	39,280.1	100.0



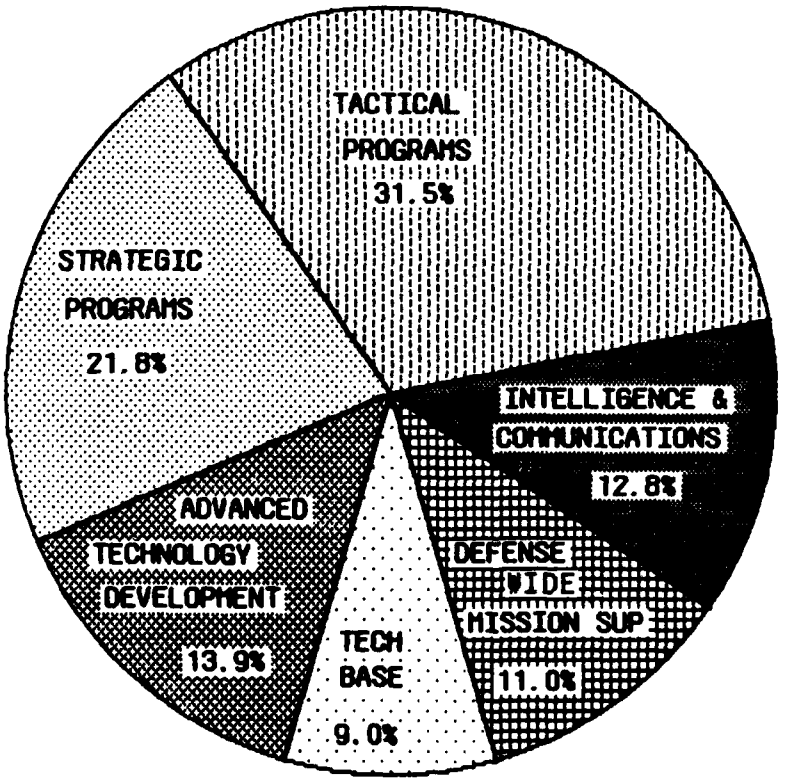
PROCUREMENT BY COMPONENT
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Army	17,409.4	20.2	19,375.9	20.0	21,366.1	20.0
Navy	31,472.2	36.6	34,020.3	35.2	37,430.1	35.0
Air Force	36,074.4	41.9	41,814.5	43.2	46,566.2	43.6
Def Agencies	971.3	1.1	1,166.2	1.2	1,391.9	1.3
NAtl Guard/ Res Equip.	176.0	0.2	380.0	0.4	--	--
Def Prod Act	--	--	10.0	--	59.0	0.1
TOTAL PROC	86,103.3	100.0	96,766.9	100.0	106,813.3	100.0



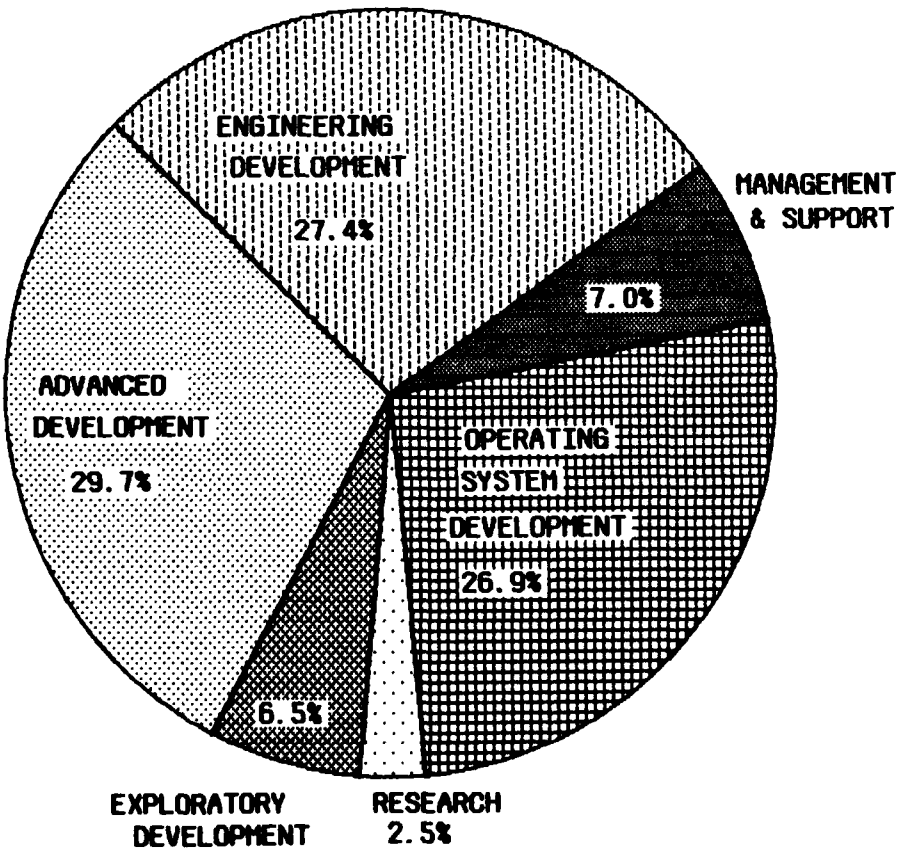
RDT&E BY BUDGET ACTIVITY
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Technology Base	3055.0	11.4	3121.0	9.9	3525.1	9.0
Advanced Tech Dev	1352.2	5.0	2765.8	8.8	5461.3	13.9
Strategic Prog	7877.7	29.3	8359.0	26.6	8555.6	21.8
Tactical Prog	7929.3	29.4	9498.2	30.2	12395.2	31.5
Intel & Comm	3406.0	12.6	3956.6	12.6	5031.1	12.8
Defwide Mission Sup	3318.2	12.3	3751.2	11.9	4311.8	11.0
TOTAL RDT&E	26938.4	100.0	31451.8	100.0	39280.1	100.0



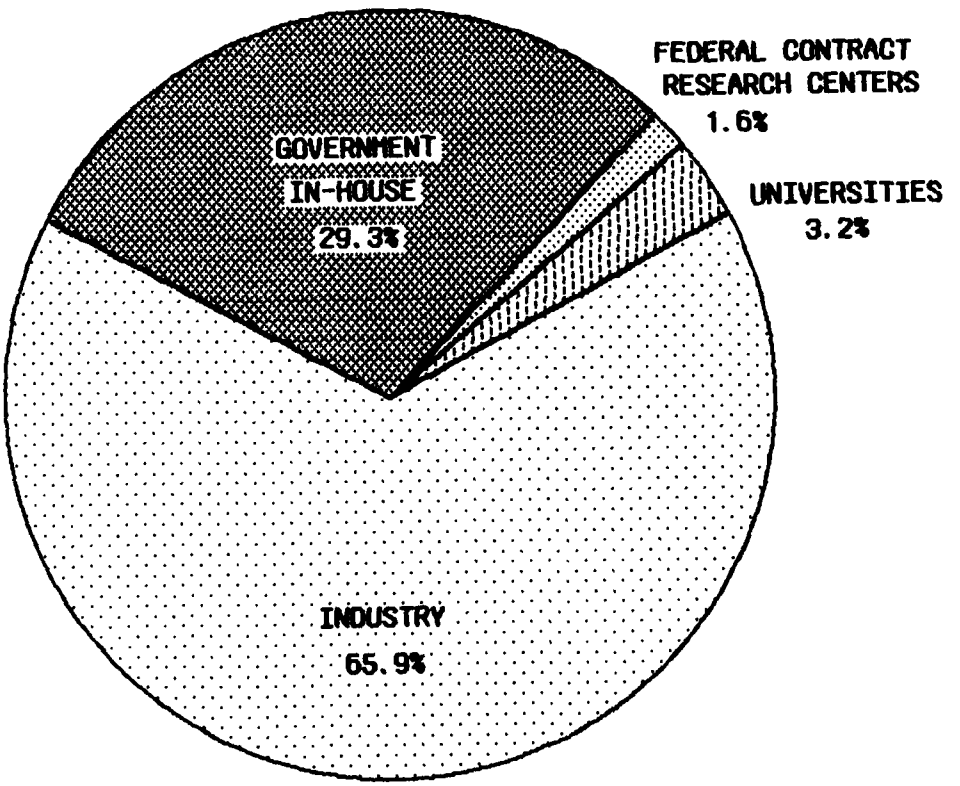
RDT&E BY R&D CATEGORY
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Research	843.0	3.1	860.8	2.7	970.8	2.5
Explor Dev	2212.0	8.2	2260.9	7.2	2555.3	6.5
Adv Dev	5936.3	22.1	6837.1	21.7	11682.8	29.7
Engin Dev	9165.1	34.0	10916.8	34.7	10747.4	27.4
Mgt & Sup	2406.5	8.9	2435.8	7.8	2743.7	7.0
Op Sys Dev	6375.5	23.7	8140.4	25.9	10580.1	26.9
TOTAL RDT&E	26938.4	100.0	31451.8	100.0	39280.1	100.0



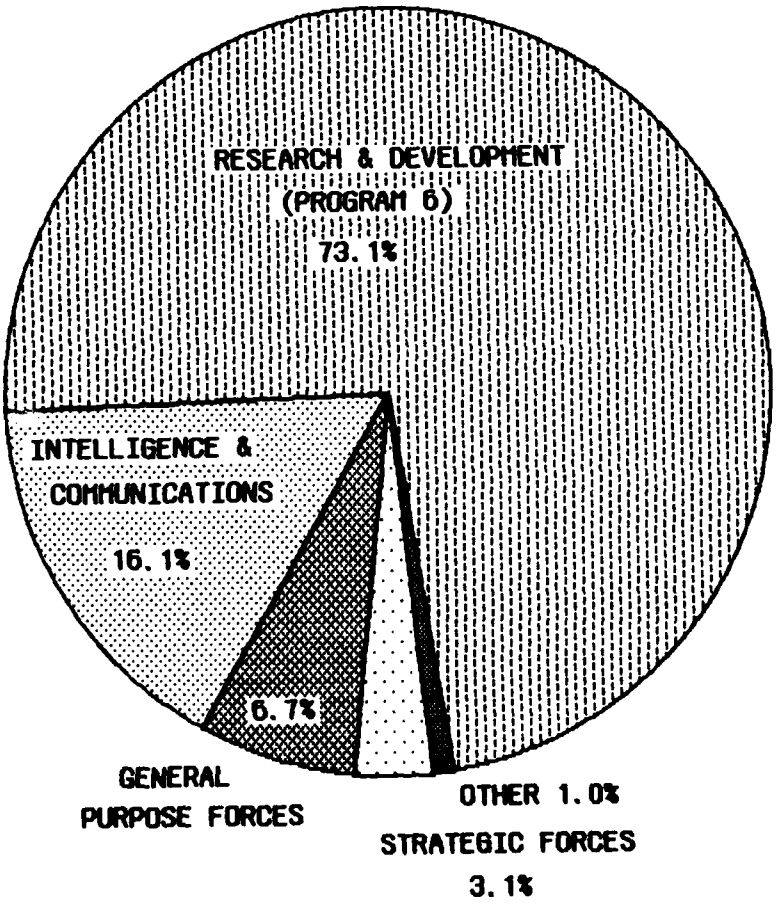
RDT&E BY PERFORMER
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Industry	18858.0	70.0	21484.3	68.3	25901.1	65.9
Govt In-House	6473.7	24.0	8272.4	26.3	11525.2	29.3
Federal Contract Research Ctrs (FCRCs)	531.3	2.0	564.1	1.8	613.3	1.6
Universities	1075.3	4.0	1131.0	3.6	1240.5	3.2
TOTAL RDT&E	26938.4	100.0	31451.8	100.0	39280.1	100.0



RDT&E BY DEFENSE PROGRAMS
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	%	FY 1985	%	FY 1986	%
Strat Forces	725.8	2.7	803.8	2.6	1205.2	3.1
Gen Purp Forces	1473.4	5.5	2052.5	6.5	2631.1	6.7
Intel & Comm	4082.9	15.2	5022.0	16.0	6345.3	16.1
Airlift/Sealift	20.6	0.1	32.1	0.1	69.6	0.2
R&D (Prog 6)	20563.0	76.3	23311.4	74.1	28700.0	73.1
Cntr Sply & Maint	63.9	0.2	215.8	0.7	317.9	0.8
Trng, Med, Other	2.8	--	5.2	--	5.3	--
Admin & Assoc Act	--	--	5.2	--	1.2	--
Spt Other Nations	6.0	--	3.8	--	4.5	--
TOTAL RDT&E	26938.4	100.0	31451.8	100.0	39280.1	100.0



PROCUREMENT BY APPROPRIATION
TOA ($ MILLIONS)
FY 1986 BUDGET ESTIMATE

	FY 1984	FY 1985	FY 1986
Aircraft Procurement, Army	3,237.1	3,900.7	3,892.5
Aircraft Procurement, Navy	10,157.6	10,903.8	12,062.6
Aircraft Procurement, Air Force	21,317.9	26,078.1	26,165.5
TOTAL AIRCRAFT PROCUREMENT	34,712.6	40,882.6	42,120.6
Missile Procurement, Army	2,840.3	3,158.3	3,386.7
Weapons (Missile) Proc, Navy	2,926.1	3,387.3	4,415.8
Missile Procurement, Air Force	7,798.6	6,888.4	10,862.7
TOTAL MISSILE PROCUREMENT	13,565.0	13,434.0	18,665.2
TOTAL SHIPBLDG/CONVERSION	11,472.4	11,584.5	11,411.6
Weapons, Tracked Combat Veh, Army	4,696.2	4,548.1	5,739.1
Ammunition, Army	1,980.1	2,646.3	2,635.0
Weapons (Non-missile), Navy	817.1	966.3	1,212.1
TOTAL WEAPONS/TRACKED VEH	7,493.4	8,160.7	9,586.2
Other Procurement, Army	4,655.7	5,122.5	5,712.8
Other Procurement, Navy	4,357.6	5,341.6	6,601.2
Other Procurement, Air Force	6,957.9	8,848.1	9,538.0
TOTAL OTHER PROCUREMENT	15,971.2	19,312.2	21,852.0
Procurement, Marine Corps	1,741.3	1,836.7	1,726.8
Procurement, Defense Agencies	971.3	1,166.2	1,391.9
National Guard/Reserve Equipment	176.0	380.0	--
Defense Production Act	--	10.0	59.0
TOTAL PROCUREMENT	86,103.3	96,766.9	106,813.3

APPENDIX B

ACRONYMS

:E	-	Aircraft Alerting Communications EMP
I	-	Anti-Ballistic Missile
I	-	Advanced Cruise Missile
	-	Common Name - DoD Standardized Computer Language
	-	Acquisition Improvement Program
:M	-	Air Launched Cruise Missile
IV	-	Air Launched Minature Vehicle
)	-	Assistant Secretary of Defense
\	-	Advanced Tactical Aircraft
3	-	Advanced Technology Bomber
'	-	Advanced Tactical Fighter
TODIN	-	Automatic Digital Network
ACS	-	Airborne Warning and Control System
:C	-	Broad-Area Surveillance Executive Committee
D	-	Ballistic Missile Defense
EWS	-	Ballistic Missile Early Warning System
	-	Biological Warfare
)	-	Congressional Budget Office
W	-	Chemical, Biological Warfare
.	-	Commodity Control List
CINC	-	Commander-in-Chief
CM/CAI	-	Computer Management/Computer Assisted Instruction
COCOM	-	Coordinating Committee
C^2	-	Command and Control
C^3	-	Command, Control and Communications
C^3I	-	Command, Control, Communications and Intelligence
CONUS	-	Continental United States
CNAD	-	Conference of National Arms Directors
CW/BW	-	Chemical Warfare/Biological Warfare
CW	-	Chemical Warfare
CY	-	Calendar Year
DARPA	-	Defense Advanced Research Projects Agency
DCI	-	Director, Central Intelligence
DCS	-	Defense Communications System
DDT&E	-	Director, Defense Test and Evaluation
DEW	-	Distant Early Warning
DIA	-	Defense Intelligence Agency
DAIP	-	Defense Acquisition Improvement Program
DIVAD	-	Divisional Air Defense (Gun)
DLA	-	Defense Logistics Agency

- Defense Meteorological Satellite Program
- Defense Nuclear Agency
- Department of Defense
- Department of Energy
- Defense Production Act

C - Defense System Acquisition Review Council

- Defense Satellite Communications System
- Defense Resources Board
- Defense Science Board

- Electronic Countermeasures
- Enhanced JTIDS System
- Extremely Low Frequency
- Electromagnetic Pulse

- Forward Line of Own Troops
- Full Scale Development
- Foreign Weapons Evaluation
- Fiscal Year

P - Five Year Defense Program

M - Ground Launched Cruise Missile

- Soviet Military Intelligence Organization

N - Ground Wave Emergency Network

M - High Speed Anti-Radiation Missile

STF - High Energy Laser System Test Facility

ICBM - Intercontinental Ballistic Missile

ILS - Integrated Logistic Support

IMIP - Industrial Modernization Incentives Program

INF - Intermediate Range Nuclear Forces

IOC - Initial Operational Capability

IR - Infrared

JAFE - Joint Advanced Fighter Engine

JCHEM - Joint Chemical Test Project

JCS - Joint Chiefs of Staff

JLC - Joint Logistics Commanders

JINTACCS - Joint Interoperability Tactical Command and Control System

JLOTS - Joint Logistics Over-the-Shore

JRMB - Joint Requirements and Management Board

JSTARS - Joint Surveillance and Attack Radar System

JTACMS - Joint Tactical Missile System

JTC3A - Joint Tactical Command, Control & Communications Agency

JT&E - Joint Test & Evaluation

JTF - Joint Tactical Fusion

JTIDS - Joint Tactical Information Distribution System

JVX - Joint Services Verticle Lift Aircraft Development Program

KGB - Soviet Civilian Intelligence and Internal Security Group

IRN - Low Altitude Navigation and Targeting Infrared System for Night

AT - Leased Satellite

- Light Helicopter Experimental

B - Low Level Laser Guided Bomb

- Long Range Intermediate Nuclear Forces

AG - Multi-Association Policy Advisory Group

- Militarily Critical Technologies List

- Multiple Launch Rocket System

- Memorandum of Agreement

- Memorandum of Understanding

- Mobile Protected Gun

D - Million Ton-Miles/Day

- Missile Experimental

- National Aeronautics and Space Administration

- North Atlantic Treaty Organization

CP - National Emergency Airborne Command Post

- Non-Strategic Nuclear Forces

- Organization of the Joint Chiefs of Staff

- Office of The Secretary of Defense

- Operational Testing

- Over-the-Horizon

OTH-B - Over-the-Horizon Backscatter

OTH-R - Over-the-Horizon Radar

P3I - Preplanned Product Improvements

PARCS - Perimeter Acquisition Radar Attack Characterization System

POMCUS - Prepositioning of Materiel Configured in Unit Sets

RAM - Rolling Airframe Missile

R&D - Research and Development

RD&A - Research, Development and Acquisition

RDF - Rapid Deployment Forces

RDT&E - Research, Development, Test and Evaluation

RO/RO - Roll-On/Roll-Off

SALT - Strategic Arms Limitation Talks

S&T - Science and Technology

SCSC - Strategic Conventional Stand-Off Capability

SCDs - Source Control Drawings

SDI - Strategic Defense Initiative

SDIO - Strategic Defense Initiative Organization

SINCGARS- Single Channel Ground Airborne Radio Systems

SLBM - Submarine Launched Ballistic Missile

SLOC - Sea Line of Communications

SRAM - Short Range Attack Missile

SSB - Ship, Submarine Ballistic

SSB/SSBN - Ballistic Missile Submarine/Nuclear Ballistic Missile Submarine