DEPARTMENT OF DEFENSE

STATEMENT ON

THE PRESIDENT'S STRATEGIC DEFENSE INITIATIVE

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THE PRESIDENT'S STRATEGIC DEFENSE INITIATIVE (SDI)

INTRODUCTION

In a speech to the American people a year ago, President Reagan offered the hope of a world made safe from the threat of ballistic missiles. This hope is based on recent advances of technology which may offer us, for the first time in history, the opportunity to strengthen deterrence through effective defenses, rather than only through the threat of retaliation. President Reagan is determined that we explore fully this opportunity.

To guide the efforts of those working toward this important goal, the President directed an intensive analysis to define a research program to investigate the technical feasibility of an effective defense against ballistic missiles, and to assess the implications of such a program for the prevention of nuclear war, for the deterrence of aggression, and for the prospects for arms control. This study was conducted last summer, and concluded that advanced defensive technologies could offer the potential to enhance deterrence and help prevent nuclear war by reducing significantly the military utility of Soviet preemptive attacks and by undermining an aggressor's confidence of a successful attack against the United States or our allies. The study also identified a research program that will clarify future technical options for a defensive system.

Although the study acknowledged that there are uncertainties that will not be resolved until more is known about the technical characteristics of defensive systems and the possible responses of the Soviet Union to U.S. initiatives, it concluded that a research program should be started now. We must start now because the Soviet Union has pursued advanced ballistic missile defense technology for a number of years, and has the only active ballistic missile defense system in the world. Unilateral Soviet deployment of an advanced system capable of countering Western ballistic missiles--added to their already impressive air and passive defense capabilities--would weaken deterrence and threaten the security of the United States and our allies. Thus, our research efforts will provide a necessary and vital hedge against the possibility of a one sided deployment. In addition, our effort could provide a potentially powerful tool to moderate the development of future offensive systems and to make the world more stable and secure.

It must be understood that our program is not a system development program. No decision has been made to develop and deploy any weapons or other elements of the potential system. Our state of knowledge of the relevant technologies is inadequate. Consequently, the aim of this program is to improve our knowledge of the relevant technologies by providing firm calculations and experimental evidence on what such technologies could do, and at what cost. Put in other words, our program is a research effort to provide the evidentiary basis for an informed decision on whether and how to proceed into system development. For a full, multi-tiered system, we expect to complete the provision of this evidentiary basis by the early 1990's. A careful analysis of defensive strategy and concepts of operation is an essential element of the basis for an informed decision. Our program also includes such an analysis.

FUNDING

We plan an aggressive, adequately funded program to pursue the relevant technologies at the maximum reasonable rate. For fiscal year 1985 we are requesting approximately $2 billion (total for DoD and DoE). We anticipate that during the fiscal year 1986-89 period, approximately $24 billion will be required.

It is impossible to estimate now, with any precision, the full costs of developing and deploying a comprehensive strategic defense system. If a system were deployed, the ultimate costs would depend on the technological approaches selected for deployment and the size of the defensive system required. These factors, in turn, would depend in part on Soviet reactions and on the nature of future arms control agreements. It is true that the total costs would be significant in relation to our overall strategic forces program. These costs, however, would be spread over 20 years or more and could well be offset, or at least partially offset, by reduced spending on strategic offensive systems. Most importantly, costs must be judged relative to expected benefits of a system that could make nuclear war less likely.

The program is not a "new start" in the usual sense. Substantially all of the relevant technologies have been funded in previous years, but not all have been specifically related to defending against ballistic missiles. To implement the President's Strategic Defense Initiative, we have focused these previously existing related research efforts into a single program, and augmented the previously planned level of DoD funding for fiscal year 1985, $1,527 million, by $250 million, for a total request of $1,777 million. The DoD request is for 71% real growth in relevant technologies from fiscal year 84 to 85, and 16% relative to pre-SDI plans for fiscal year 1985. Part of the Initiative includes technologies involving nuclear devices, which are developed by the Department of Energy. Their work in direct support of this initiative in fiscal year 1985 is a portion of their nuclear research, development, and test funding. It is estimated at $210 million (It is not a separate, specific line item.) for a total program of $2 billion.

MANAGEMENT

To manage the DoD's portion of this effort, we are establishing a Strategic Defense Technology Office, which will be headed by the SDI Program Manager who will report directly to the Secretary of Defense. Mr. Weinberger is presently in the process of selecting him.

The DoD portion of the program has been divided into five technical areas, and a new program element has been established for each of them. These program elements are:

1. Surveillance, acquisition, and tracking,
2. Directed energy weapons,
3. Kinetic energy weapons,
4. Systems analyses and battle management, and
5. Support programs.

These are Defense level program elements. The funds will be held in the Office of the Secretary of Defense and will be provided, at the determination of the SDI program manager, to the individual Services and Defense Agencies who will execute the individual efforts.

THE CONCEPT OF DEFENSE

The flight of a ballistic missile can be considered in four phases. The first is the boost phase, in which the first and second stage rocket engines of the missile are burning. They produce an intense and unique infrared signature. In the second, or post-boost phase, the bus separates from the main engines, and the multiple warheads are deployed from the bus, along with any penetration aids such as decoys and chaff. In the third, or mid-course phase, the multiple warheads and penetration aids travel on ballistic trajectories through space, above the earth's atmosphere. In the fourth, terminal phase, the warheads and penetration aids reenter the earth's atmosphere, where they are affected by atmospheric conditions.

Our program seeks to explore technologies enabling the engagement of attacking missiles in all four phases of their flight. This would require a number of capabilities, including global, full-time surveillance to warn of an attack. There is leverage in engaging the missiles in the boost phase, because the multiple warheads and penetration aids have not yet been been deployed. After deployment, we must be able to discriminate warheads from decoys, so we can target only the real threats. We must be prepared for the attacking warheads to be salvage fuzed; therefore, our terminal defenses must engage them at as high an altitude as possible. And in addition to the individual engagement capabilities, we must have a survivable battle management system capable of efficient, global control.

The technologies for the terminal defenses are also likely to be applicable to defense against the shorter range nuclear ballistic missiles, such as submarine launched ballistic missiles and theater range ballistic missiles, which may not have trajectories high enough to permit their attack with exoatmospheric systems, and which have short times-of-flight. Such technologies are important for defense of our allies.

THE TECHNOLOGIES

Surveillance, acquisition, and tracking:

Surveillance, acquisition, tracking and kill assessment (SATKA) includes sensing of information for initiation of the defense engagement and for battle management and assessment of the status of forces before and during a defense engagement against nuclear ballistic missiles. It also includes signal processing and data processing for discrimination of threatening reentry vehicles from other objects and backgrounds. A crucial philosophy of design is that surveillance and acquisition should be autonomous in each phase of the engagement, but that tracking and kill assessment should be consultative through battle management. These requirements are necessary so that the contributions to leakage from missed detections remain independent to insure very high quality tracking and kill assessment.

The goal of this program is to develop and demonstrate the capabilities needed to detect, track, and discriminate objects in all phases of the ballistic missile trajectory. The technology developed under this program is quite complex, and any eventual system must operate reliably even in the presence of disturbances caused by nuclear weapons effects or direct enemy attack.

This program has several component technology development programs which culminate in hardware demonstrations. A focused effort to study the observables during each phase is the first major element of the program. Optical, infrared, and radar signatures of reentry vehicles and penetration aids will be measured. The new techniques of radar imaging represent another element. Similarly, optical imaging, using lasers rather than radar beams, will be pursued. Finally, a substantial effort is included to develop cooled infrared sensors and near real-time signal processing.

The technology programs outlined above will lead to a series of hardware demonstrations. Four key demonstrations have been identified at this time, with the possibility of more in the 1990s as technology progresses. One demonstration will be an advanced boost-phase detection and tracking system. Another major demonstration is designed to track and discriminate attacking objects in mid-course using advanced Long

Wavelength Infrared (LWIR) sensors. The ability of airborne infrared sensors to identify and track reentering objects will be demonstrated in the Army's Airborne Optical System (AOS) development program. Ground radar imaging and tracking demonstrations will continue as part of the Army's terminal and midcourse defense programs. As other technologies mature, such as radar and optical imaging, new demonstrations will be conducted. As these demonstrations are completed, we will have obtained the technical information required to decide whether defensive systems of the necessary capability can be built, considering this key element of the defense design.

Directed Energy Weapons:

This program pursues four basic concepts identified as potentially capable of meeting a responsive threat--space-based lasers, ground-based lasers, space-based particle beams, and nuclear driven directed energy weapons. It also provides for establishment of the National Tri-Service Laser Test Range at White Sands Missile Range, NM. The basic technical thrusts include beam generators (lasers and particle accelerators), beam control, large optics, and acquisition, tracking and pointing. Our request includes funds to search for technological opportunities for new and innovative capabilities.

The goal of the directed energy technology program is to bring the most promising concepts for boost and post-boost phase intercept to an equivalent technical maturity in the early 1990's. At that point we expect to be able to demonstrate a readiness for technology validation in system level demonstrations of the concepts selected to move into that phase. To achieve that goal we plan to demonstrate the feasibility of the leading candidate beam generators by the mid 1980's and their scalability to weapon performance levels in the late 1980's or early 1990's. In beam control we will demonstrate by the end of the decade a capability to control wavefront errors, maintain beam alignment within the system, compensate for atmospheric effects; and provide the components necessary to transmit and control the high intensity beams. In large optics, we plan by the 1990's to demonstrate several approaches for providing the large diameter ground and space-based optics required for most directed energy concepts and all surveillance systems employing optical and electro-optical sensors. In our acquisition, tracking and pointing efforts, we envision in-space tests that verify our capability to point with the necessary precision, to acquire and track targets of interest, and to provide early experiments in imaging and designation. Finally, we are considering integrated technology experiments to show that we can integrate the weapon subsystems with requisite efficiency. With these demonstrations completed we will have provided the basis for a decision whether we are ready to move into the more complex system level demonstrations required in the technology validation phase of R&D.

Kinetic Energy Weapons:

Kinetic energy weapons include interceptor missiles and hypervelocity gun systems. The primary roles for these weapons include (1) midcourse engagement of reentry vehicles not destroyed during boost or post-boost phases, and of post-boost vehicles that have not dispensed all of their RV's, (2) terminal (i.e. endoatmospheric) engagement of RV's not destroyed during the previous phases of their flight, (3) space platform defense against threats not vulnerable to directed energy weapons, and (4) boost-phase engagement of short time-of-flight, short range submarine launched ballistic missiles. Additional roles for these weapons include (1) boost phase intercept from space-based platforms, and (2) midcourse engagement from space-based platforms. The kinetic energy weapons will rely on nonnuclear kill mechanisms to destroy the intended target. The key technologies required to develop these weapons include (1) fire control, (2) guidance and control, (3) warheads and fuzing for guided projectiles capable of being launched by missiles or hypervelocity guns, (4) hypervelocity launchers, (5) and high performance interceptor missiles.

The goals of the kinetic energy weapons program are: (1) expansion of the technology data base to support the development of improved and advanced weapons and (2) development and flight demonstration of kinetic energy weapons which are designed to satisfy the SDI mission needs outlined above. Technology programs are planned for endoatmospheric and exoatmospheric interceptor designs, a hypervelocity launcher design, and the systems engineering and analysis required to integrate the various advanced subsystems and components into effective system constructs. Investigations will also be undertaken in novel and advanced techniques which have the potential for a high payoff in performance and/or cost effectiveness in the design of these weapons systems. Hardware development and flight test demonstration of a number of kinetic energy weapons system designs will also be undertaken as part of this program.

Systems Analyses and Battle Management:

This program has been divided into two technology projects. The Battle Management/Command, Control, and Communications technology project will develop the technologies necessary to allow eventual implementation of a highly responsive, ultra reliable, survivable, endurable and cost effective BM/C^3 system for a low-leakage defense system. This BM/C^3 system is expected to be quite complex and must operate reliably even in the presence of disturbances caused by nuclear effects or direct enemy attacks. This program seeks to (1) develop the tools, methods, and components necessary for development of the BM/C^3 system, and (2) quantify the risk and cost of achieving such a BM/C^3 system to control the complex, multi-tiered SDI system. The systems analyses project will provide overall SDI systems guidance to weapons, sensors, C^3, and supporting technologies. Tasks include threat analyses, mission analyses, concept formulation, system conceptual design, and subsystem requirements definition, system evaluation, and technology assessment for all levels of a multi-tiered, low-leakage system.

One of our early tasks will be to conduct a "sanity check" on the defense responsibilities allocated to the various phases of the multi-tiered system by the Defensive Technology Study. Even though we know that many of our weapons and sensor concepts will require orders of magnitude performance improvements to accomplish the President's defense objectives, we also know that effective overall system guidance will efficiently focus these technology efforts and help us avoid "gold plating" and "blind alleys."

Obviously, if such a complex defense system were deployed, it would require positive control of its operations. We have to assure that we can turn the system on when it is needed and assure that it is safe when not needed. Just as importantly, the system must not be regarded as a "paper tiger" by the Soviets if it is to serve as an effective deterrent to nuclear war. Therefore, its credibility must be based on a demonstrated capability to manage the surveillance, tracking and intercept actions over the multi-tiers of this complex system. The information processing capability, specifically the development of complex software packges, necessary to associate outputs from multiple sensors, performing discrimination and designation, and "birth to death" tracking, plus kill assessment is expected to stress software development technology.

Our immediate need is for effective approaches and tools for achieving high performance processors and software, and responsive communications networks that provide high reliability and fault tolerance. Evaluation and demonstration of this complex defense system and its C^3 will largely depend upon simulation. Therefore, development of effective modeling and simulation tools will also be an early priority endeavor.

Support Programs:

This program element funds a collection of essential efforts designed to provide timely answers to a variety of critical SDI support related questions. The Defensive Technologies Study identified two areas that should receive priority attention in the SDI program.

First, for each weapon concept under consideration, we must develop the ability to scientifically predict the minimum energy that will be required, in a variety of engagement scenarios, to kill unhardened, retrofit hardened, and responsively hardened Soviet systems. These data will have a large effect on our choice of candidate system concepts. The feasibility of SDI may well hinge on the results of these efforts. The Lethality and Target Hardening project of the Support Programs effort is structured to provide these data.

Second, the ability of any deployed ballistic missile defense system to survive in the face of dedicated attack and to continue to function effectively must be established. The concepts, technologies and tactics necessary to insure continued system effectiveness will be defined and developed under the Survivability element of Support Programs. The output from this effort will be fed into all other elements of the SDI--particularly into the Systems Concepts and Analyses efforts.

Additionally, support programs will fund development of the technologies necessary for improved space logistics capabilities. These include the advanced orbital transfer vehicle capabilities that SDI will likely require. We will also evaluate the technical feasibility and cost effectiveness of using extraterrestrial materials for certain SDI applications.

Many SDI system elements (weapons, sensors, etc.) will require large amounts of electrical power. The Power and Power Conversion element of support programs will fund concept definition and technology development for multimegawatt power systems. This effort will fully exploit the technologies being developed in the joint NASA, DoE, DARPA SP-100 program. Both nuclear and non-nuclear systems and technologies will be considered.

<u>The Department of Energy's Contribution to the SDI program</u>:

Although funded separately, the Department of Energy (DoE) program is integral to the overall Strategic Defense Initiative program. DoE funded efforts include concepts for nuclear driven x-ray lasers, survivability and lethality, and support subsystems. Other efforts, such as space-based neutral particle beam technology, are being performed by the DoE laboratories with DoD funds. A memorandum of understanding, to be signed by the Secretaries of Defense and Energy, will establish specific relationships between the elements of DoD and DoE engaged in planning and execution of the SDI. In accord with current policy, the DoE will have primary responsibility for nuclear source development, and the DoD for applications, target acquisition, beam control, and pointing/tracking. The DoE laboratories have unique facilities and capabilities to address many aspects of these difficult problems.

CONCLUSION

In summary, we believe that an effective defense against ballistic missiles could have far-reaching implications for enhanced deterrence, greater stability, and improved opportunities for arms control. Hence we have gathered the existing efforts in the relevant technologies into a focused program of five DoD program elements, and added emphasis to some of the efforts, thereby augmenting the planned funding by about sixteen percent. Our efforts do not seek to replace proven policies for maintaining the peace, but rather to strengthen their effectiveness in the face of a growing Soviet threat. The essential objective of the Strategic Defense Initiative is to provide future options to diminish the risk of nuclear destruction and to increase overall stability.

By the end of the decade, we will have conducted a number of ground, airborne, and space experiments. The knowledge gained from these tests will help to identify those technologies that are most promising and support decisions in the early 1990's on whether and how to proceed with development of ballistic missile defenses.