THE STRATEGIC DEFENSE INITIATIVE

STATEMENT BY

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I am pleased to provide a written statement for your deliberations on the Strategic Defense Initiative (SDI). By way of background I chaired the Defensive Technologies Study which has been used by the Department of Defense and the Department of Energy as the technical guidance for the SDI. I would like to preface my remarks with my firm conviction that our conclusions, as set forth in the Defensive Technologies Study reports, represent the most comprehensive and technically valid analysis possible. To a person, I am convinced that we had available those most familiar with the technical issues and most able to produce an accurate and unbiased assessment. I have never worked with a more impressive or dedicated group of people than were assembled for the Defensive Technologies Study. The conclusions of the study fully warrant your consideration as the best technical assessment possible.

I will not review the technical details of our study, other testimony you have heard today and will review in the coming months will cover those areas. I would, however, like to preface my remarks with a discussion of the groundrules we used for our work. First, we concentrated on what I call the "long-poles in the tent." By this I mean that we recommended intensive efforts only on those technical issues upon which the ultimate feasibility of an effective ballistic missile defense hinges. As a corollary to this, we recommended deferring development of well understood technologies until they are needed. For example, if we choose to

deploy boost-phase systems we will most likely need upgraded space launch systems. However, my colleagues at NASA assure me that new launch vehicles could be developed in less than ten years. For this reason we did not recommend an immediate effort on this area. Correspondingly, we were not asked for, nor did we recommend resources for assuring readiness for responding to a Soviet ABM "breakout." Such needs, if justified, would require separate funding. We did, however, recommend that ongoing development in some areas, even though it may not be needed until later, not be subject to precipitous adjustment. For example, terminating ongoing programs which are nearly complete, but which must be restarted in a few years at great costs, was not considered prudent. Finally, we firmly believe that it is essential to preserve substantial resources, at least 5%, for new and innovative technologies. Just as the technologies which appear to make effective ballistic missile defense conceivable have only emerged in the last few years, we believe that the technologies which may eventually be incorporated in such a defense have probably not yet been developed. I feel that the latter ground rule is of paramount importance, particularly with regard to involving our academic communities. I urge you to work hard to preserve this vital resource which has so often in the past been sacrificed in the interest of near-term requirements.

I want to emphasize that we did not recommend a system development and deployment program. Rather we recommended a

research and technology program which will provide essential data on which future Presidents and Congresses will be able to make decisions.

I would like to relay our general conclusions to you word for word. These conclusions were worked out by the study team panel leaders with great care. These are conclusions which I am confident represent the concensus of the team:

o Powerful new technologies are becoming available that justify a major technology development effort that provides future technical options to implement a defensive strategy.

o Survivability is an especially critical issue whose resolution requires a combination of technologies and tactics that remain to be worked out.

o The deployment of directed-energy weapons in space by either or both sides: not only requires significant technical advances but also poses difficult policy issues which need to be addressed.

o Technologies currently within the state-of-the-art will not provide solutions to unconstrained, long-term threats.

o Focused development of technology for a comprehensive ballistic missile defense will demand strong central management, dedication, and perseverance.

o The most capable systems have multiple layers. Of these layers boost-phase intercept has the greatest leverage but is also most difficult to achieve.

o Significant demonstrations of critical ballistic missile defense functions can be performed in the next ten years which will also provide visible evidence of progress toward in-depth ballistic missile defense.

I would like to elaborate on these points and respond to a number of misconceptions which may have been promulgated by both advocates and opponents.

First, the entire study team strongly endorsed the requirement for strong central management. The technologies which we are pursuing are so broadly based and so require long-term commitment, that they must be centrally managed. By this I mean that the program must be structured so that its manager can shift resources from less promising to more promising areas. The program manager further must be able to budget and plan for multi-year programs based solely on SDI requirements. Research and

technology for the SDI must not be traded every year against detailed operational needs. Finally, the SDI manager must be able to have direct and frequent access to national decision makers, as well as streamlined communications to the government and industry labs doing the work.

Many of my colleagues ask me why we are reopening an issue which they believed was forever closed during the ABM debate in the mid 1970s. First, I don't believe that the issue was ever closed for the Soviets. The data which we saw, and which I'm sure you will review in the months ahead, provided us with striking evidence that the Soviet Union has pursued with vigor all of the technologies we have recommended and many which we do not even understand yet. Secondly, those technologies which are essential to a truly effective defense against ballistic missiles are just emerging. In the 1960s and early 1970s we had no way to effectively perform boost-phase intercept; we had insufficient means to discriminate between decoys and warheads; we could not simultaneously manage thousands of engagements; and we were forced to consider the use of nuclear warheads at such low altitudes within the atmosphere that collateral damage to the defended area would have been substantial. Now, directed energy and even "hypervelocity" kinetic energy weapons appear promising for boost phase intercept. Precision sensors make unambiguous detection and descrimination of warheads from decoys and debris possible. New

electronics advances make it possible both to manage tens of thousands of engagements simultaneously, but also, when coupled with precision sensors make it feasible to perform "hit-to-kill" intercepts without requiring nuclear warheads for the defense. These reasons provided the team with compelling rationales for reexamining the technical issues associated with achieving an effective ballistic missile defense.

The popular press has emphasized the exotic nature of certain technologies included in our study. I feel compelled to set the record straight on this illusion. Our recommended program does not concentrate on so-called "Star-Wars" weapons. The directed energy area, which I suppose has elicited the most such attention, is less than a fourth of the program. The largest portion of the recommended effort is to develop effective surveillance, acquisition, tracking, and assessment sensor systems. These technologies are vital to the nation not only with regard to strategic defense but also for strategic and tactical warning.

Many of my scientific colleagues (not in our study group) are skeptical about whether an effective ballistic missile defense is feasible. Moreover, many believe such systems would be prohibitively expensive. I would like to say at the outset that no one knows how effective defensive systems can be made, nor how much they might cost. I do know that the technologies we reviewed

make such an effective defense conceivable. Whether an effective defense is possible is the primary reason for embarking on the SDI program. With regard to cost, we do not know ultimate cost. But perhaps the major aspect of the investment in defensive technologies is to make it less expensive to stop a warhead than it is to get it to its target. Clearly, in such cases the cost tradeoffs from defensive deployments could favor them over offensive deployments.

One of the most important findings of our study was the critical nature of space element survivability. While, in the early stage of our effort, we do not know the extent to which space-deployments might be needed, it is likely that at least highly survivable surveillance and tracking sensors will be needed. While these systems must survive an opponent's first strike against them, this is a difficult but certainly a feasible task, and one which warrants considerably more effort than currently devoted to it. There is no magic offensive weapon which renders space systems unsurvivable. Popular countermeasures such as the so-called "space-mines" may be countered through both tactics and technology. For example, spacecraft may be placed at such depths in space that it may take many hours or even days to reach them.

Another often stated opinion is the idea that any defensive deployment could readily and cheaply be countered. We looked at

the countermeasure issue very carefully, and we believe that the technologies we are working on will lead to a multi-tiered system which is extremely difficult to countermeasure. For example, we will be working on surveillance technologies which would observe a potential target using multi-colored infrared, visible, and radar radiation. Although a decoy could be cheaply constructed which would mimic a warhead to any single sensor, a decoy which would mimic real warheads for a variety of sensors would be almost as heavy and sophisticated as an actual warhead. There is thus no incentive or payoff to an opponent in proliferating such decoys. Similarly, an attacking missile might be successfully launched against a single weapon, for example a laser, at the cost of considerable decrease in payload and accuracy. However, other weapons, perhaps a missile launched kinetic interceptor, would be unaffected by the same countermeasures. The combination of different weapons and sensors in three or more layers would at the minimum drive an opponent to extremely expensive, and significantly less capable missiles, a positive result in its own right. These questions and options have, therefore, played a central role in our recommended research and technology program.

Some of my scientific colleagues are concerned that a focused US strategic defense research program could be both destabilizing and lead to a dangerous space arms race. The Future Security Strategy Study, the policy counterpart to our Defensive

Technologies Study, considered these issues in detail and came to a wholly different conclusion. However, from my perspective I do not feel that these opinions are directly relevant to the program we proposed. The Soviet Union has pursued defensive technologies at the "technology limited" pace for several decades. It is unlikely, since it is technology-limited, that they could accelerate their effort more than they have, whatever we do. How a US effort could incite them to greater efforts in defensive technologies is unclear.

At the close of our study we worked out a summary statement for our work. I would like to relay portions of it to you because it succinctly states the opinions of those Americans most familiar with the technologies of strategic missile defense:

"The Defensive Technologies Study Team reviewed, evaluated, and prioritized the technological issues underlying the ballistic missile defense of the continental United States and it allies. We reviewed a set of defense system concepts and supporting technologies in various stages of development and created both fiscally constrained and technology-limited programs to evaluate these technologies."

"We took an optimistic view of newly emerging technologies and with this viewpoint concluded that a robust, multitiered

ballistic missile defense system can eventually be made to work. The ultimate utility, effectiveness, cost, complexity, and degree of technical risk in this system will depend not only on the technology itself, but also on the extent to which the Soviet Union either agrees to mutual defense arrangements and offense limitations."

"We urge that a vigorous research and technology program, broadly based but highly goal oriented, be pursued. This program would permit informed decisions on whether to initiate, in the early 1990s, an engineering validation phase leading to a deployed defensive capability after the year 2000. Certain intermediate technologies can, and should be demonstrated as part of the evolutionary research and technology program."

In closing, I would like to leave you with two opposite but equally compelling rationales for proceeding with our recommended program. From a pessimistic view, for an opponent to achieve effective missile defenses without a corresponding US defensive capability would as I said earlier be catastrophic to our strategic posture. Our techological analyses this summer showed us that effective defenses are now conceivable. Available data shows us that the Soviet Union is already pursuing these technologies at the fastest pace which their technology allows. The United States and its allies must, at a minimum, pursue a

vigorous research and technology program to provide future governments with information on possible defensive moves by our opponents. From an optimistic viewpoint, which I share, strategic relationships based on a balance of offensive and defensive forces is not only morally correct, but can lead to a safer world. The awesome threat of nuclear weapons can only be lessened if we have in hand technical capabilities at least as valuable as the nuclear armed ballistic missile. Our work has shown that defensive technologies offer a rich promise for such capabilities. The Strategic Defense Initiative will provide future options for the nation to enhance our and our childrens safety and security. There is no way to avoid facing this issue - the program deserves your strong support.