TOP SECRET

THE SECRETARY OF DEFENSE
WASHINGTON

Draft - 12/10/66

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Production and Deployment of the NIKE-X.

A number of events have occurred during the last year which, taken together, tend to bring to a head the long-standing issue of whether to produce and deploy a U.S. anti-ballistic missile defense:

1. The Soviet Union has accelerated the deployment of hard ICBMs beyond the rates forecast in last year's NIE (but not beyond the "higher than expected" case on which the U.S. Defense Program was based).

2. The Soviet Union has started the deployment of an anti-ballistic missile system around Moscow and perhaps a second type of ABM system in other parts of the country.

3. The Chinese Communists have launched and demonstrated a nuclear-armed, 400-mile range ballistic missile, and there is some evidence that they may be preparing to test a booster in the ICBM range.

4. Our own anti-ballistic missile system, the NIKE-X, has now reached a stage of development where it may be feasible to start concurrent production and deployment.

5. The Joint Chiefs of Staff have reaffirmed their recommendation that a decision be made now to deploy, with an initial operational capability in FY 1972, a NIKE-X system which would provide for area defense of the continental U.S. and local defense of 25 cities against a ~~"low"~~ Soviet threat.

6. The Congress for the first time since 1959 has appropriated funds to prepare for the production and deployment of an ABM defense system.

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There are five somewhat overlapping but distinct purposes for which we might want to deploy an ABM system:

1. To protect our cities against a Chinese Communist missile attack in the 1975 t 1985 period.

2. To protect our land-based strategic offensive forces (i.e., MINUTEMAN) against a Soviet missile attack.

3. To guard against nuclear armed missiles launched by accident towards the United States.

4. To discourage the use of "nuclear blackmail", i.e., the threat of attack with one or a few missiles against targets of moderate value.

5. To protect our cities (and their population and industry) against a heavy, sophisticated Soviet missile attack.

After studying the subject exhaustively, Mr. Vance and I have concluded that we should not initiate at this time an ABM deployment for the last purpose. We believe that:

1. The Soviet Union would be forced to react to a U.S. ABM deployment by increasing its offensive nuclear force with the result that:

   a. The risk of a Soviet nuclear attack on the U.S. would not be further decreased.

   b. The damage to the U.S. from a Soviet nuclear attack, in the event deterrence failed, would not be reduced in any meaningful sense.

   The foundation of our security is the deterrence of a Soviet nuclear attack. We believe such an attack can be prevented if it is understood by the Soviets that we possess strategic nuclear forces so powerful as to be capable of absorbing a Soviet first strike and surviving with sufficient strength to impose unacceptable damage on them (e.g., destruction by blast and radiation alone of approximately [redacted]. We have such power today. We must maintain it in the future, adjusting our forces to offset actual or potential changes in theirs. a/

There is nothing I have seen in either our own or the Soviet Union's technology which would lead me to believe we cannot do this. From the beginning of the NIKE-ZEUS project in 1955 through the end of this current fiscal year, we will have invested a total of about $4 billion on ballistic missile defense research -- including NIKE-ZEUS, NIKE-X and Project DEFENDER. And, during the last five or six years, we have spent about $1.2 billion on the development of penetration aids to help ensure that our missiles could penetrate the enemy's defenses. As a result of these efforts, we have the technology already in hand to counter any defensive force changes the Soviet Union is likely to undertake in the foreseeable future.

We believe the Soviet Union has essentially the same requirement for a deterrent or "Assured Destruction" force as the U.S. Therefore, deployment by the U.S. of an ABM defense which would degrade the destruction capability of the Soviet's offensive force to an unacceptable level would lead to the expansion of that force. In that event, we would be no better off than we were before.

2. With respect to the other four purposes, a limited ABM deployment might offer sufficient advantages to justify the cost (estimated

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a/ Last year, as a hedge against a "higher-than-expected" Soviet threat -- i.e., the deployment of a full-scale ABM defense and the incorporation of multiple, independently-aimed reentry vehicles (MIRVs) in their large, hard ICBMs--we proposed in the FY 1967 Budget, and the Congress supported, the following improvements in our strategic offensive forces:

1. The acceleration of the development of the POSEIDON missile, including area penetration aids, on a schedule which could make it operationally available in the summer of 1970.
2. The production and deployment of the MINUTEMAN III with [redacted] MK-12 multiple independently-aimed reentry vehicles each.
3. The production and deployment of the MK-17 reentry vehicle for the MINUTEMAN II (the MK-17 promises a kill probability [redacted] for the MK-11 [redacted] now used on the MINUTEMAN II).
4. The replacement of all MINUTEMAN I by FY 1972.
5. Initiation of engineering development of new area penetration aids packages for all MINUTEMAN missiles and of a terminal penetration aids package for the MINUTEMAN III.

at $3 to $5 billion to produce and deploy, and $200 to $250 million per year to maintain and operate). a/ Such a deployment, which could be completed by 1973, might:

a. Hold U.S. fatalities from a Chinese Communist missile attack in the mid-1970s below two million, if their operational inventory reaches 100 missiles; or possibly zero, if the number does not exceed 25.

b. Ensure the survival of about 400-450 MINUTEMAN in a heavy, sophisticated Soviet attack in the mid to late 1970s.

c. Provide a very high degree of protection against accidental attacks.

d. Virtually eliminate the threat of "nuclear blackmail".

e. Reduce, as a by-product, U.S. fatalities from a Soviet attack against our cities in the early 1970s, if the Soviets do not react immediately to our ABM deployment.

In the pages which follow I will explore in detail the foundation for these conclusions:

1. The Soviet Strategic Threat

The latest National Intelligence Estimate, dated Oct. 20, 1966, indicated that the Soviets have accelerated the deployment of two hard ICBMs, the SS-11 and SS-9. (The SS-9 is a large, storable liquid-fueled missile, roughly the size of our TITAN II, with a warhead yield [redacted] The SS-11 is a small, storable liquid-fueled missile, about the size of our MINUTEMAN, with a warhead yield [redacted] The November 1965 NIE estimated that by mid-1968 the Soviets would have operational about 100-110 SS-9s and 200-250 SS-11s; we now estimate that they will have 130-140 SS-9s and 320-400 SS-11s by that date. b/

a/ The cost to complete development, test and evaluation of the system is not included because we assume that this work would be done in any event.

b/ In addition to the SS-9s and SS-11s the NIE forecasts that the Soviets will have in mid-1968 273 other missiles, including missiles at the test ranges.

By mid-1971, we believe they could have a total of 800-1100 operational ICBMs on launchers, compared with last year's estimate of 500-800 by mid-1970. We believe the higher end of the range of estimates will prevail if the Soviets decide to emphasize quantity in an effort to match the size of our ICBM force, and the lower end if they choose to emphasize quality. In the first case, they would concentrate on the SS-11 which is a relatively simple and cheap missile. In the second case, they would place added emphasis on the SS-9 which is a more expensive and also, for certain purposes, a much more effective missile. The SS-11 because of its relatively poor CEP and small payload would have little value against hard targets such as our MINUTEMAN silos, and it is therefore essentially a retaliatory weapon for use against cities. The Soviets also have some older ICBMs but these are already being phased out and few are expected to be left in the operational force by 1971.

Although we still have no direct evidence of such an effort, the Soviets might also develop and install multiple independently-aimed reentry vehicles (MIRVs) on their SS-9s. However, an effective capability with such reentry vehicles would require much greater accuracies (lower CEPs) than have thus far been achieved by Soviet ICBMs. If they were to start now, they could probably achieve an operational capability by about 1971-72; and we would probably be able to detect the testing of such a system perhaps two years earlier. Improvements in both accuracy and penetration capability could also be made in the SS-11s, and in addition the Soviets might deploy a new solid fuel, highly accurate small ICBM.

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2. History of the U.S. ABM Effort

In considering the issue of whether to deploy the NIKE-X, it might be useful to review briefly the history of the U.S. ABM effort, the kind of system originally envisioned, the evolution of technology in that field and the attitudes of past Presidents, Secretaries of Defense, Chiefs of Staff, the Congress, etc.

The predecessor of the current ABM development program, the NIKE-ZEUS, was begun in FY 1955. Up until the launching of the SPUTNIK in October 1957, the project proceeded at a leisurely pace. Congressional attitudes towards the program ranged from incredulousness regarding its operational feasibility (especially in view of the problems then being encountered in anti-bomber defense) to concern over a new "roles and missions" fight between the Army (ZEUS) and the Air Force (WIZARD).

In the aftermath of SPUTNIK a new sense of urgency developed with regard to all aspects of advanced military technology. From FY 1955 through FY 1957, a total of only $12.2 million was applied to NIKE-ZEUS R&D but in FY 1958 alone the total rose to $66 million and in FY 1959, to $237 million. By the spring of 1958, when the FY 1959 Budget was before the Congress, the Army had already proposed the production of initial sets of equipment. Secretary of Defense McElroy, however, argued that "we should not spend hundreds of millions on production of this weapon pending general confirmatory indications that we know what we are doing." His view prevailed for the moment.

It was not until the FY 1960 Budget that NIKE-ZEUS deployment became a real issue. The Army's initial request included $875 million for ZEUS -- $35 million for R&D, $720 million for procurement and $115 million for construction. President Eisenhower, however, sent to the Congress a request of $300 million for R&D and test facilities only. The House Appropriations Committee recommended the addition of $200 million "for the acceleration of the NIKE-ZEUS and/or the modernization of Army firepower." Secretary McElroy agreed to accept $137 million for the acceleration of NIKE-ZEUS and $63 million for Army modernization. The Senate approved these amounts and added $200 million more for Army modernization. The final enactment provided $375 million for NIKE-ZEUS and/or Army modernization.

In the fall of 1959, in connection with the development of the FY 1961 Budget, the Army proposed a new NIKE-ZEUS deployment plan consisting of 35 local defense centers (one for each defended area), 9 forward acquisition radars and 120 batteries. The typical battery was to consist of 50 missiles on launchers and 16 radars, a missile-to-radar ratio very close to that of the current Soviet GALOSH system. An initial operational capability was to be achieved by FY 1964 and the entire program completed by FY 1969, with a total investment cost estimated at $13 to $14 billion, of which $1.5 billion would be required in FY 1961.

The system was designed around a relatively slow speed and limited range interceptor missile and mechanically steered radars. Because of the missile's slow speed, it had to be fired long before the incoming target reentered the atmosphere, thereby precluding the use of the atmosphere as a means of distinguishing real warheads from other objects such as decoys or tankage fragments; and the limited range of the missile reduced the potential kill radius. (Indeed, the plan called for the firing of three ZEUS against each attacking ICBM.) Because the radars were mechanically steered (like the local GALOSH radars), the traffic-handling capabilities of the system were low, leaving it vulnerable to saturation attacks.

This plan was rejected by President Eisenhower, who pointed out in his FY 1961 Budget message that:

> "The NIKE-ZEUS system is one of the most difficult undertakings ever attempted by this country. The technical problems involved in detecting, tracking, and computing the course of the incoming ballistic missile and in guiding the intercepting ZEUS missile to its target--all within a few minutes--are indeed enormous.
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> "Much thought and study have been given to all of these factors and it is the consensus of my technical and military advisors that the system should be carefully tested before production is begun and facilities are constructed for its deployment. Accordingly, I am recommending sufficient funds in this budget to provide for the essential phases of such testing. Pending the results of such testing, the $137 million appropriated last year by the Congress for initial production steps for the NIKE-ZEUS system will not be used."

The Joint Chiefs of Staff, with one dissenting vote, supported the President's position and the Congress agreed to limit the program to research and development.

The weaknesses in the NIKE-ZEUS system led in 1961 and 1962 to the development of a new and different system known as NIKE-X. To help solve the problem of discriminating actual warheads from decoys and other objects, a new, high acceleration terminal defense missile, the SPRINT, was designed. Because of its fast reaction time, this missile would permit the defense to wait until the enemy attack penetrated well into the atmosphere where the lighter objects, such as unsophisticated decoys, would be separated from the warheads, thus permitting the defense to concentrate more of its fire on the latter. To solve the problem of limited handling capacity, a new family of phased-array radars was developed. These radars employ a relatively new principle; instead of scanning the skies with an electronic beam by mechanically rotating the entire radar structure, the structure is covered with thousands of sensors and is kept stationary while the electronic beam does the rotating. Because an electronic beam can be rotated a million times faster than a mechanical structure, the phased-array radar has a far greater search and tracking capacity. In other words, it can simultaneously handle many more incoming objects, thus eliminating one of the major limitations of the old NIKE-ZEUS system.

With the phased-array radar and SPRINT missiles, the defense battery could bring firepower to bear on all targets entering an area 20 miles high and 25 miles in radius. However, even if these batteries were deployed around all our major cities, a large part of the nation would still be left undefended and the attacker would have the option of ground-bursting his warheads outside the defended areas, thus producing vast amounts of lethal fall-out which could be carried by the winds over the defended areas. Moreover, a terminal (or local) defense compels the defender to allocate his resources in advance, leaving the attacker free to concentrate his resources against whatever targets he may choose at the moment of the attack.

[redacted] Its warhead is to be capable of destroying ballistic missile reentry vehicles at ranges of five to ten miles if they are hardened, and 10 to 100 miles if they are not. About a dozen properly located batteries of such a missile could provide some coverage over the entire United States. Together with the SPRINT, it could provide a defense in depth, permitting all incoming objects to be attacked first well above the atmosphere and then the surviving objects a second time as they enter the atmosphere. Moreover, by overlapping the coverage of the OLYMPIA batteries, some of the attacker's inherent advantage against terminal defenses alone could be overcome, since the defender at the moment of the attack would also have the choice of concentrating his resources over those targets he chooses to protect.

The deployment of an ABM system did not become a serious issue again until earlier this year. It was clear to us from the beginning, i.e., 1961, that the NIKE-ZEUS as then conceived would not be an effective ABM system against the type of ballistic missile attack the Soviets would be able to launch by the end of the decade. Accordingly, both in President Kennedy's and your administrations, we have steadfastly maintained that the development of a more effective ABM system should be pursued on an urgent basis but that no production or deployment should be undertaken until much more was known about the system's technical capabilities and its likely effect on the strategic situation generally. This view found substantial support within the Executive Branch and in the Congress up until recently, although an abortive attempt was made by some members of the Senate in 1963 to authorize an appropriation for the deployment of the NIKE-ZEUS. However, in acting on the FY 1967 Defense Budget, the Armed Services Committees and the Defense Appropriations Subcommittees of both Houses recommended, and the Congress appropriated, about $168 million to prepare for the production of the NIKE-X system. It is, therefore, clear that the deployment of this system will be a major issue in the next session of the Congress.

3. Technical Feasibility of the NIKE-X System as Presently Visualized

Attachment 1 provides a description of each of the major elements of the NIKE-X system and its current development status. Briefly, the system would consist of a number of different types of phased-array radars and two types of interceptor missiles, which could be deployed in a variety of configurations:

a. Multi-function Array Radar (MAR) -- a very powerful phased-array radar which can perform all the defense functions involved in engaging a large simultaneous attack: central control and battle management, long-range search, acquisition of the target, discrimination of warheads from decoys or "spoofing" devices, precision tracking of the target, and control of the defense interceptor missiles.

b. TACMAR Radar -- a scaled down, slightly less complex and less powerful version of the MAR, which would be used in a "light" deployment of the NIKE-X. It can perform all the basic defense functions on a smaller scale.

c. VHF Radar -- a relatively low frequency, phased-array radar required for the very long-range search and acquisition functions involved in area defense. To achieve the full potential of the extended-range OLYMPIA, the target must be picked up at much greater distances in order to compute its trajectory before the OLYMPIA is fired.

d. Missile Site Radar (MSR) -- a much smaller, phased-array radar needed to control the SPRINT and OLYMPIA interceptor missiles during an engagement. It can also perform the functions of the TAC-MAR but on a considerably reduced scale. Actually, a number of different sizes are being studied. This "modular" approach will permit us to tailor the capacity of the radar to the particular needs of each defended area.

e. [redacted]

f. SPRINT -- a high-acceleration interceptor missile which can climb to 80,000 feet in 10 seconds. It is designed to make intercepts between 5,000 and 100,000 feet at a range of 25 miles.

In addition to these major elements of the system, an entire new infrastructure, including base facilities, communications, logistics support, etc., will be required. The exact cost of this infrastructure cannot be determined until a specific deployment plan is decided upon, but it would surely be substantial for any deployment.

The technical principles involved in the radars are now fairly well established. One R&D MAR-type radar has been constructed at the White Sands Missile Range. A contract has been let for the power plant of a second MAR-type radar, which is to be constructed on Kwajalein Atoll. The Missile Site Radar is well along in development and the construction of one of these radars on Kwajalein Atoll has also begun.

Testing of the SPRINT missile was started at White Sands in November 1965 with one complete success, two partial successes and three failures. The failures are attributed mostly to insufficient quality control but some of the missile's components may have to be redesigned. The tempo of testing will steadily increase during the current fiscal year and we are advised by our technical people that the missile will eventually reach its design goals. The nuclear warhead is also well along in development and does not appear to present any particular problem.

The OLYMPIA is still on the drawing boards. It represents a very substantial redesign of the original NIKE-ZEUS and we will not know until it is flight tested a year and half hence how well it will perform. However, we are less concerned with the missile itself than we are with its warhead. A significant number of development tests will have to be performed, all underground, before the design parameters can be established; and then we will have to proof test the resulting warhead, again underground. (The feasibility of a full yield test underground has still to be established.) Accordingly, there is still considerable technical uncertainty concerning the warhead. Although alternative warheads could be used on the OLYMPIA, their effectiveness would be much lower.

Facilities for testing both the SPRINT and the OLYMPIA will be constructed on Kwajalein Atoll. These, together with the TACMAR and Missile Site Radar (MSR) and the programs for the computers will give us all of the major elements of the NIKE-X system which are essential to test its overall performance against reentry vehicles fired from Vandenberg Air Force Base in California. (We feel we know enough about the VHF radar technology to be able to use the mechanically steered radars already on Kwajalein as simulators.) The system will be tested in stages, starting with the MSR and SPRINT tests in January 1969, then the OLYMPIA missile in July 1969 and the TACMAR radar between July and December 1970. Upwards of 100 test shots will be launched from Vandenberg to Kwajalein during the period 1969-72 to test the system thoroughly as a whole. a/ The most important objective of this effort is to determine proper system integration and computer programming, since the individual components of the system will have already been tested ahead of time.

But even after this elaborate test program is completed, a number of technical uncertainties will still remain unresolved. Chief among these are the following:

1. Large Sophisticated Attacks. Notwithstanding the number of test shots planned, the ability of the system to cope with a large sophisticated attack will still remain to be demonstrated, except to the extent that such attacks can be simulated in the computers.

2. Discrimination of Decoys and Other "Spoofing" Devices. Although the MAR-type radars are specifically designed to deal with this problem, discrimination will always remain an unresolved issue. We have been studying and developing such devices for many years and we are now installing some of them in our offensive missiles. No doubt new devices and the counters to them will be invented in the future, and the contest between the offense and the defense will continue as it has in the area of manned bombers.

a/ This schedule alone raises a question whether the R&D program has advanced far enough to warrant a commitment to production in FY 1968.

3. Blackout. Detonation of nuclear devices high in the atmosphere can seriously degrade the effectiveness of the defense's radars. These detonations can be either the defensive warheads (self blackout) or deliberate explosions of the incoming warheads (precursor blackout). They have the effect of producing an area in the atmosphere similar to an opaque cloud which the radars cannot see into or through. The size of the area is a function of how high the burst occurs and of the frequency of the radars. The blacked-out region is larger at higher altitudes and appears larger to lower frequency radars. At the lower altitudes, the blackout region is essentially the visible fireball. For the terminal defenses employing SPRINT missiles in the lower atmosphere and radars in the microwave region (about 1200 megacycles), the blackout effects can be minimized and are well understood from previous testing.

For the area defense the problem is more severe. For one thing, the number of tests conducted by both the U.S. and the Soviet Union at the altitudes of interest for area defense (above 200,000 feet) is relatively small. In the U.S. tests, the data collected are not complete enough to answer all the technical issues, although our continuing study of the available data is increasing our knowledge of the blackout effects. However, we can never resolve all the uncertainties with the existing data. We know there will be blackout effects and we know that we can choose a radar frequency and proliferate radars to minimize them. But we do not know how many precusor nuclear blasts the Soviets would have to place over the United States to black out our radars. And, we do not know how much they learned from their nuclear tests. Consequently, we do not know precisely what their uncertainties would be in using this as an offensive tactic. We do know that the blackout effects can be offset by raising the frequencies of the radars, and we are doing this in the case of the VHF radars. However, because the area defense radars must detect small targets at long ranges and because the price of a radar set operating in this manner increases with the frequency, there is a limit on how far we can go in this direction to counter blackout.

4. Programming the Computers. The management of a sophisticated ballistic missile attack engagement presents an extremely complex problem. To control the phased-array radars and guide the missile, powerful computers and sophisticated "programs" are needed. The size of the computer varies with the type of radar. For the area defense (with VHF/UHF radars), computer speeds and capacities equivalent to the best of today's

commercial computers are adequate. The MSR and the MAR will need much more powerful computers, development of which has been underway since 1962. However, it is not the computer itself which is our major concern, but rather the production of the "programs" which must be designed in advance to reflect every conceivable eventuality the system may confront. Our experience in programming the SAGE computers against manned bomber attacks has revealed some of the complexities, and the costs, of such an undertaking. Whether we can provide for all of the variables involved in such a vastly more complex problem as anti-missile defense has yet to be demonstrated. Here, again, we will have a much better idea of what is actually involved in programming the computers when the prototype system on Kwajalein is demonstrated in the 1970-72 period.

5. Production and Operational Problems. We have learned from bitter experience that even when the development problems have been solved, a system can run into trouble in production or when it is put into operation. All too often the development prototype cannot be produced in quantity without extensive re-engineering. Production delays are encountered and costs begin to spiral. Sometimes these problems are not discovered until the new system actually enters the inventory and has to function in an operational environment. The TERRIER, TALOS, and TARTAR ship-to-air missiles are a good example; after spending about $2 billion on development and production of these missiles, we had to spend another $350 million correcting the faults of those already installed and we still plan to spend another $550 million modernizing these systems.

In this connection, it is worth noting that had we produced and deployed the NIKE-ZEUS system proposed by the Army in 1959 at an estimated cost of $13 to $14 billion, most of it would have had to be torn out and replaced, almost before it became operational, by the new missiles and radars of the NIKE-X system. By the same token, other technological developments in offensive forces over the next seven years may make obsolete or drastically degrade the NIKE-X system as presently envisioned. We can predict with certainty that there will be substantial additional costs for updating any system we might consider installing at this time.

4. Assuming the NIKE-X System is Technically Feasible, Should It Be Deployed Now?

This question can be answered only within the context of the general nuclear war problem as a whole and our overall national security objectives. For many years the overriding objective of our national policy with regard to general nuclear war has been to deter the Soviet Union (or any other nation) from launching a surprise nuclear attack against us or our Allies. As long as that remains our overriding objective, the capability for "Assured Destruction" must receive first call on all of our resources and must be provided regardless of the cost and the difficulties involved. Programs designed to limit damage to our population and industrial capacity in the event the deterrent fails can never substitute for an "Assured Destruction" capability in this context, no matter how much we spend on them. It is our ability to destroy the attacker as a viable 20th century nation that provides the deterrent, not the ability to limit damage to ourselves.

What kind and amount of destruction we would have to be able to inflict on an attacker to provide this deterrent cannot be answered precisely. However, it seems reasonable to assume that in the case of the Soviet Union, the destruction [redacted] Such a level of destruction would certainly represent intolerable punishment to any industrialized nation and thus should serve as an effective deterrent to the deliberate initiation of a nuclear attack on the United States or its Allies.

Once sufficient forces have been procured to give us high confidence of achieving our "Assured Destruction" objective, we can then consider the kinds and amounts of forces which might be added to reduce damage to our population and industry in the event deterrence fails. But here we must note another important point, namely, the possible interaction of our strategic forces programs with those of the Soviet Union. If the general nuclear war policy of the Soviet Union also has as its objective the deterrence of a U.S. first strike (which I believe to be the case), then we must assume that any attempt on our part to reduce damage to ourselves (below what they would estimate we would consider "unacceptable levels") would put pressure on them to strive for an offsetting improvement in their deterrent forces. Conversely, an increase in their "Damage Limiting" capability would require us to make greater investments in "Assured Destruction", which, as noted earlier in this memorandum, is precisely what we are now doing. It is in this context that we should examine the desirability of increasing our "Damage Limiting" capabilities against a heavy, sophisticated Soviet attack in the 1970s.

As I noted earlier, the major elements of the NIKE-X system, as they are now being developed, would permit a variety of deployments; two have been selected for the purposes of this analysis. The first, which I will call "Posture A", represents a light U.S. defense against a Soviet missile attack on our cities. It consists of an area defense of the entire continental United States, providing redundant (overlapping) coverage of key target areas; and, in addition, a relatively low-density SPRINT defense of the 25 largest cities to provide some protection against those warheads which get through the area defense. a/ The second deployment, which I call "Posture B", is a heavier defense against a Soviet attack. With the same area coverage, it provides a higher-density SPRINT defense for the 50 largest cities.

Shown on the following table are the components and the costs (which, if past experience is any guide, are understated by 50 to 100 percent for the systems as a whole) of Posture A and Posture B, together with the time frames in which the deployments can be completed:

	POSTURE A		POSTURE B	
	Number	Invest. Cost ($ Billion)	Number	Invest. Cost ($ Billion)
Radars				
TACMAR	7	$ 1.7	3	$ 0.6
MAR	0	0	8	2.6
VHF	6	0.3	6	0.3
MSR	26	3.4	95	7.9
Invest. Cost		$ 5.4		$11.4
Missiles				
OLYMPIA	1200	$ 1.1	1200	$ 1.1
SPRINT	1100	0.7	7300	3.1
Invest. Cost		$ 1.8		$ 4.2
DoD Invest. Cost		$ 7.2		$15.6
AEC Invest. Cost		1.0		2.0
Total Invest. Cost (ex-R&D)		$ 8.2		$17.6
Annual Operating Cost		$ 0.38		$ 0.72
No. of Cities w/Term.Def:	25		50	
IOC with Decision 1/67:	FY 71		FY 71	
Deployment Completed	FY 74		FY 75	

In addition, if technically feasible, we would have to provide some improvement in our defense against manned bomber attack in order to preclude the Soviets from undercutting the NIKE-X defense; we would also want to accelerate the fallout shelter program. The investment cost (including R&D) of the former is estimated at about $1.5 to $2.4 billion

a/ This is essentially the deployment now recommended by the Joint Chiefs of Staff.

and would provide for a small force of F-111 or F-12 type interceptors (e.g., 48 F-111s or 32 F-12s) and about 42 aircraft warning and control aircraft (AWACS). With the introduction of these new types of aircraft, we might be able to phase out most of the present interceptor aircraft and a large part of the ground-based aircraft warning and control network, thus producing an actual saving in operating costs over the longer term. The expanded fallout shelter program would cost about $800 million more than the one we are now pursuing. We would also need some of our anti-submarine warfare forces for use against Soviet missile submarines, but we are not yet clear whether these ASW forces would actually have to be increased over the currently planned levels. In any event, the "current" estimates of the investment cost of the total "Damage Limiting" package would amount to at least $10.5 billion for Posture A and at least $20 billion for Posture B ("final" costs for each of these Postures would probably be 50 to 100 percent higher a/).

To test the contribution that each of these NIKE-X deployments might make to our "Damage Limiting" objectives, we have projected both the U.S. and Soviet strategic nuclear forces (assuming no reaction by the Soviets to the U.S. ABM deployment) to FY 1976, by which time Posture B, the heavier defense, could be fully in place. These forces are shown on the table which follows:

a/ Even before the systems became operational, pressures would mount for their expansion at a cost of still additional billions. The unprotected, or relatively unprotected, areas of the U.S. (e.g., Alaska, Tampa, Birmingham, Sacramento) would claim that their tax dollars were being diverted to protect New York and Washington while they were left naked. And, critics would point out that our strategic offensive force is premised on a much larger Soviet threat (the "possible", not the "probable" threat); they would conclude that the same principles should be applied to our strategic defensive forces. For these and other reasons, I believe that, once started, an ABM system deployed with the objective of protecting the United States against the Soviet Union would require an expenditure on the order of $40 billion over a ten year period.

Projected U.S. and Soviet Strategic Nuclear Forces, Mid-1976.
(assuming no reaction by the Soviets to U.S. ABM deployment)

	U.S.	USSR
ICBMs (Hard Launchers)	[redacted]	
Large (TITAN II/SS-9 Class)		300 - 200
Small (MINUTEMAN/SS-11 Class)		500 - 1000
SLBMs		
Large (POSEIDON Class)		0
Small (POLARIS/SSN-5 Class)		180 - 450
Total No. of BM Warheads		980 - 1650
Bombers (for U.S./Soviet Attacks)		
Heavy		70 - 110 a/
Medium		300 - 500 a/
ABM (Anti-ballistic Missile Defense)		
Area Interceptors		1000*
Terminal Interceptors		4000*
Air Defense		
Fighters		2400 - 1800 b/
SAM Batteries		1255 - 1800 b/

The fatalities which these Soviet forces could inflict upon the U.S. (with and without a U.S. ABM defense) and the fatalities which the U.S. forces could inflict on the Soviet Union (with a Soviet ABM defense) are shown on the following table:

a/ Includes only heavy bomber force. Current NIE accepts only minimal use of Soviet medium bombers for CONUS attack.

b/ Numbers, per the NIE, assume some improved Soviet air defenses, some F-4 FIDDLER-type interceptors with look-down radar and some Improved HAWK-type SAMs.

Note: Forces for other years are shown in Attachment 2.

*NIE does not estimate numbers.

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Number of Fatalities [a] in an All-out Strategic Exchange (in millions), 1976 [b]
(ASSUMES NO SOVIET REACTION TO U.S. ABM DEPLOYMENT)

U.S. Programs	Soviets Strike First, U.S. Retaliates: U.S. Fat.	Soviets Strike First, U.S. Retaliates: Sov. Fat.	[redacted]: U.S. Fat.	[redacted]: Sov. Fat.
Approved	100	[redacted]	80	[redacted]
Posture A	15		15	
Posture B	10		5	

The first case, "Soviets Strike First, U.S. Retaliates", is the threat against which our strategic forces must be designed. The second case, [redacted], is the case that would determine the size and character of the Soviet reaction to changes in our strategic forces, if they wish, as clearly they do, to maintain an "Assured Destruction" capability against us.

These calculations indicate that without NIKE-X and the other "Damage Limiting" programs discussed earlier, U.S. fatalities from a Soviet first strike could total about 100 million; even after absorbing that attack, we could inflict on the Soviet Union about [redacted] fatalities. Assuming the Soviets do not react to our deployment of an ABM defense, which is a most unrealistic assumption, Posture A might reduce our fatalities to 15 million and Posture B, to about 10 million.

Although the fatality estimates shown for both the Soviet Union and the U.S. reflect some variations in the performance of their respective ABM systems, they are still based on the assumption that these systems will work at relatively high levels of efficiency. (In fact, for the purpose of these calculations we have assumed that the Soviet ABM system will be just as good as the NIKE-X, even though we believe the system, or systems, which they are now deploying are, in fact, far inferior.) If these ABM systems do not perform as well as our technical people postulate, fatalities on both sides could be considerably higher than shown in the table above, or the costs would be considerably higher if major improvements or additions had to be made in the systems to bring them up to the postulated level of performance.

a/ Fatality figures shown above represent deaths from blast and fall-out; they do not include deaths resulting from fire storms, disease, and general disruption of everyday life.

b/ The data in this table and the table on page 20 are highly sensitive to small changes in the pattern of attack and small changes in force levels. [redacted]

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If the Soviets are determined to maintain an "Assured Destruction" capability against us and they believe that our deployment of an ABM defense would reduce our fatalities in the [redacted] case to the levels shown in the table above, they would have no alternative but to increase the second strike damage potential of their offensive forces. They could do so in several different ways: by deploying a new large, land-based ICBM (either mobile, or hardened and defended), or a new submarine-launched missile like our POSEIDON, or by adding large numbers of hardened but undefended SS-9s or SS-11s. They have the technical capability to deploy any of these systems with highly accurate MIRVs (or single warheads) by the mid-1970s. Shown in the table below are the relative costs to the Soviet Union of responding to a U.S. ABM deployment with a land-mobile ICBM system:

Level of U.S. Fatalities Which Soviets Believe Will Provide Deterrence a/ (Millions)	Cost to the Soviets of Offsetting U.S. Cost to Deploy an ABM
22	$1 Soviet cost to $4 U.S. cost
33	$1 Soviet cost to $2 U.S. cost
44	$1 Soviet cost to $1 U.S. cost
55	$1-1/4 Soviet cost to $1 U.S. cost
66	$1-2/3 Soviet cost to $1 U.S. cost

If the Soviets choose to respond to our ABM deployment with such a system (200 missiles against Posture A and 650 against Posture B), the results would be as shown below:

Number of Fatalities in an All-out Strategic Exchange (in millions), 1976 (ASSUMES SOVIET REACTION TO U.S. ABM DEPLOYMENT)

U.S. Programs	Soviets Strike First, U.S. Retaliates		[redacted]	
	U.S. Fat.	Sov. Fat.	U.S. Fat.	Sov. Fat.
Approved (no response)	100	[redacted]	80	[redacted]
Posture A	90		75	
Posture B	75		70	

In short, the Soviets have it within their technical and economic capacity to offset any further "Damage Limiting" measures we might undertake, provided they are determined to maintain their deterrent against us. It is the virtual certainty that the Soviets will act to maintain their deterrent which casts such grave doubts on the advisability of

a/ U.S. fatalities resulting from a Soviet second strike.

our deploying the NIKE-X system for the protection of our cities against the kind of heavy, sophisticated missile attack they could launch in the 1970s. In all probability, all we would accomplish would be to increase greatly both their defense expenditures and ours without any gain in real security to either side.

5. Deployment of NIKE-X for Other Purposes

As I noted at the beginning of this memorandum, a limited, i.e., light, deployment of the NIKE-X (estimated investment cost, about $4 billion) might offer a high degree of protection for our cities against the kind of ballistic missile attack the Chinese Communists may be able to launch in the late 1970s or early 1980s; and, with some special additions (estimated investment cost, about $1 billion), ensure the survival of a significant portion of our MINUTEMAN force even against a heavy, sophisticated Soviet attack. Such a deployment would have an inherent capability to provide a very high level of protection against accidental and "nuclear blackmail" attacks. And, as a by-product, it would also have some capability to reduce U.S. fatalities from a Soviet attack against our cities in the early 1970s, provided the Soviets do not immediately react to our ABM deployment.

Shown below are the components and costs of a "light" NIKE-X deployment designed to achieve the foregoing purposes:

	BASIC SYSTEM	MINUTEMAN INCREMENT	TOTAL SYSTEM
Radars			
VHF	4	+1	5
MSR	17	+3	20
Missiles			
OLYMPIA	700	+300	1000
SPRINT	150 a/	+100	250
Investment Cost ($ Bil.)			
DoD	$3.6	$ .8	$4.4
AEC	.3	.3	.6
Annual Oper. Cost ($ Bil.)	.18	.06	.24
IOC with Decision Jan. '67			Apr. '71
Deployment Completed			Jan. '73

a/ For defense of VHF radars.

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6. Defense Against the Chinese Communist Nuclear Threat

The Chinese Communists' nuclear weapons and ballistic missile development programs are apparently being pursued with high priority. Recent evidence suggests that it is possible they will conduct either a space launching or a long range ballistic missile launching before the end of 1967. Such an event would suggest that the Chinese might be aiming at an initial operating capability (IOC) for an ICBM as early as 1969, though an IOC in the 1970s still seems most likely. A launching in 1967 would also probably be taken as signifying an even more immediate threat than would actually exist. However, it still appears unlikely that the Chinese could have a significant number of ICBMs before the mid-70s or that those ICBMs would have great reliability, speed of response or substantial protection against attack.

The effectiveness of the "light" NIKE-X deployment (described in the preceding section) in reducing U.S. fatalities from a Chinese Communist attack in the 1975-85 period is shown in the table below:

	Chinese Strike First (Operational Inventory)	
	25 Missiles	100 Missiles
U.S. Fatalities: (In Millions)		
Without ABM	8	20
With ABM	0-1	0-2

This "light" defense could probably preclude damage in the 1970s almost entirely. As the Chinese force grows to the level it might achieve by 1980-85, additions and improvements might be required, but relatively modest additional outlays could probably limit the Chinese damage potential to low levels well beyond 1985.

7. ABM Defense of U.S. Offensive Missile Forces

The most severe threat we must consider in planning our "Assured Destruction" forces is an extensive, effective Soviet ABM deployment, combined with a Soviet deployment of a substantial hard-target kill capability (i.e., highly accurate MIRVed SS-9s or SS-11s). By reducing the CEP of their SS-9 missile, and equipping each booster with 6 MIRVs of [redacted] to [redacted] the Soviets could destroy large numbers of our MINUTEMAN missiles. An extensive, effective Soviet ABM deployment could then intercept and destroy a large part of our residual missile warheads. (These Soviet offensive and defensive threats are both higher than expected in the latest National Intelligence Estimates.)

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We could not count on more than two years of warning between the first intelligence indications of a Soviet MIRV development effort and the start of deployment of the system. Assuming that the Soviets start such a development immediately and press forward with their ABM deployment at a rate of 1000 interceptors per year (beginning in FY 1968), they might achieve the build-up in their threat shown below:

GREATER-THAN-EXPECTED SOVIET THREAT

	FY 70	FY 71	FY 72	FY 73	FY 74
Soviet Threat to MINUTEMAN					
SS-9	150	150	150	150	100
SS-9 MIRV (Six [redacted] RVs/Missile)	0	50	100	150	200
SS-11 (improved accuracy)	300	550	800	925	925
Total No. of BM Warheads	450	1000	1550	1975	2125
Soviet ABM Defense					
Area Interceptors / Terminal Interceptors	3200	4200	5200	6200	7200

The effect of such a deployment could be to reduce the number of U.S. MINUTEMAN surviving attack to the levels shown below:

	FY 70	FY 71	FY 72	FY 73	FY 74
MINUTEMAN Surviving	[redacted]				

To offset the possibility of such a decline in the damage potential of our missile forces, we have authorized the development and production of the POSEIDON. Should still additional offensive power be required, and such a requirement is not now clear, we have considered the development and deployment of a new Advanced ICBM (a new large payload missile with an as yet undetermined basing system designed to reduce vulnerability to a Soviet MIRV threat). The deployment of the NIKE-X as a defense of part of our MINUTEMAN force would, however, offer a substitute for the possible further expansion of our offensive force.

Shown below is the contribution the "light" NIKE-X deployment (described on page 22) might make to the survival of our MINUTEMAN force against the greater-than-expected Soviet threat, compared with the "No Defense" case:

	FY 70	FY 71	FY 72	FY 73	FY 74
No Defense Case	[redacted]				
MM Surviving *					
NIKE-X Defense					
ABM Interceptors					
MM Surviving *					

* In addition, the POLARIS and POSEIDON force would survive.

Thus, the "light" NIKE-X deployment (with a total investment cost of about $3 to 5 billion and an annual operating cost of $200 to 250 million) would be able to maintain the MINUTEMAN force's retaliatory capability even against the higher-than-expected threat.

8. Capability of the "Light" NIKE-X Deployment to Reduce U.S. Fatalities from a Deliberate Soviet Attack in the 1970s.

As I noted earlier, a limited deployment of the NIKE-X would, as a by-product, also help to reduce U.S. fatalities from a Soviet attack. Shown below is the contribution such a system could make in 1976 if the Soviets do <u>not</u> react to our ABM deployment:

	Number of Fatalities in an All-out Strategic Exchange (in millions), 1976			
	Soviets Strike First, US Retaliates		[redacted]	
US Programs	US Fat.	Sov. Fat.	US Fat.	Sov. Fat.
No ABM Def	100	[redacted]	80	[redacted]
Lt ABM Def (No Sov Reaction) a/	75		55	

But with a limited and low-cost reaction the Soviets could offset the benefits of the NIKE-X deployment

9. Effect of U.S. ABM Deployment on Relations with Other Nations

With regard to our NATO Allies, two questions arise: (1) What would be their reaction to our deployment of an ABM system?; and (2) Would they want to deploy such a system?

Some European governments and many European specialists in defense and arms control matters have exhibited a growing interest in ABM defense. At the insistence of several European countries, ABM defense was discussed at the recent NATO arms control experts conference. The European and Canadian attitude as expressed at the NATO meeting was generally hostile to a U.S. ABM deployment. The same attitude was expressed by the U.K. delegation at the recent U.S.-U.K. bilateral talks on ABMs. This reaction appears to be based on a desire to avoid an accelerated arms race which Europeans believe would upset the detente. There is also some fear on the part of the British that an ABM race would price them out of the nuclear business.

a/ Projection of Soviet Strategic Forces based on latest NIEs.

Even if the U.S. offered the Europeans a similar system, it is unlikely that they would accept; only Germany has expressed a mild interest thus far. This is so for several reasons. First, the cost (at least $6 billion, and probably more, for a meaningful system) would involve a substantial increase in their defense budgets. Second, the European preoccupation with deterrence rather than defense makes it unlikely that they would pay for such an ABM system. Third, the Europeans are unlikely to achieve the degree of political and decision-making unity which would be necessary to deploy an effective ABM system.

10. Attitude of U.S. Public Toward ABM Defense

Perhaps the most difficult problem we will have to face in a decision not to deploy at this time an ABM system for defense of our cities against a Soviet ballistic missile attack is the attitude of our Congress and our people. The first reaction of most Americans to the events I have described at the beginning of this memorandum will inevitably be in favor of an immediate start on production and deployment, if for no other reason than the Soviets are deploying such a system. More mature reflection on all of the factors involved in this vastly complex problem should convince at least the majority of the informed public that any attempt on our part to build an ABM defense which could keep our fatalities in a Soviet "second strike" below what the Soviets consider would deter a U.S. attack, would almost certainly force them to respond by increasing their offensive forces, and would therefore be self-defeating. But we will have to undertake a massive program to present all of the relevant information, and in an understandable form, to both the Congress and the general public. Without such an understanding, we cannot hope to gain their support for a sensible ABM program.

11. Conclusions

In view of the great uncertainties surrounding both the Soviet and Chinese Communist missile threats over the next five to ten years, and the advantages that even a limited ABM defense might offer in dealing with possible accidental and "nuclear blackmail" attacks, a "light" deployment of the NIKE-X may be worth its cost. But none of the four purposes, for which a deployment of NIKE-X might make sense, would justify a crash program at this time. Even without an ABM defense, and even if the higher-than-expected Soviet threat develops, our sur[redacted]viving offensive missile and bomber forces could inflict at least [redacted] of the population) on the Soviet Union in 1974. Moreover, we do not know when, if ever, the higher-than-expected Soviet threat will develop. Nor do we believe that the Chinese Communists could have a significant number of ICBMs before the mid-1970s.