DRAFT
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THE SECRETARY OF DEFENSE
WASHINGTON

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MEMORANDUM FOR THE PRESIDENT

SUBJECT: Recommended FY 1966-1970 Programs for Strategic Offensive Forces, Continental Air and Missile Defense Forces, and Civil Defense (U)

I have completed my review of the three major components of our General Nuclear War posture: the Strategic Offensive Forces, the Continental Air and Missile Defense Forces, and Civil Defense. (This memorandum summarizes the characteristics of our current strategic posture, the major programs proposed by the Services, my recommended program, and the rationale for choice among these alternatives.

The estimated costs (excluding R&D and reserve forces) for the previously approved, Service proposed, and recommended programs are presented below: a/

	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70	Total FY 66-FY 70
	(Total obligational authority, $ millions)						
Previously Approved	7719	6839	6038	5413	5024		
Service Proposed	8237	8769	9612	10597	9063	8474	46,515
SecDef Recommended	7184	6390	5412	5190	4978	4880	26,850

There are six major issues involved in our FY 1966-1970 program for the General Nuclear War Forces. These issues concern:

1. The development and deployment of a new manned bomber (estimated 5-year systems cost for a force of 200 aircraft -- $8.9 to $11.5 billion).
2. The size of the strategic missile force (estimated 5-year cost for an additional force of 200 MINUTEMAN II missiles -- $1.3 billion).
3. The overall level of the anti-bomber defense program (estimated 5-year cost, if units recommended for phaseout are retained -- $300 to $350 million).
4. The production and deployment of a new manned interceptor (estimated cost for a force of 216 IMI aircraft -- $4 billion).

a/ Preliminary cost estimates, to be revised after completion of budget review.

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5. The production and deployment of the NIKE X anti-missile system (estimated 5-year systems cost, depending upon the mode of deployment, numbers of radars, and numbers of cities covered (11 to 47)--($8 to $24 billion).

6. The construction of fallout shelters for the entire population (estimated cost -- $5.2 billion).

Before I discuss these major issues and my other recommendations to improve our general nuclear war capabilities, I believe it would be useful to review the nature of the general nuclear war problem itself, the characteristics of properly balanced general nuclear war forces, and the capabilities of the presently-programmed forces.

A. NATURE OF THE GENERAL NUCLEAR WAR PROBLEM

By general nuclear war, we mean a war in which strategic nuclear weapons are directed against the homelands of the U.S. or the U.S.S.R. Such attacks might be directed against military targets only, cities only, or both, either simultaneously or with a delay; they might be selective in terms of targets or they might be general. The following types of strategic forces are involved:

1. Strategic Offensive Forces
   Manned bombers, ICBMs and submarine-launched missiles, together with the associated command and control systems.

2. Strategic Defensive Forces
   Anti-aircraft defenses: manned interceptors; surface-to-air missiles; and their associated warning and control systems.
   Anti-ballistic missile defenses: warning systems and active defense systems

3. Civil Defense Programs
   Fallout shelters, warning, etc.

It may be assumed that both the United States and the Soviet Union have the same general strategic objectives: (1) To deter deliberate nuclear attack by maintaining a clear and convincing capability to inflict severe damage on the attacker even after an enemy first strike; and (2) In the event such a war should nevertheless occur, to limit damage to its own population and industrial capacity.

The first of these objectives we call "Assured Destruction," i.e., the capability to destroy both the Soviet Union and Communist China as viable societies, even after a well planned and executed surprise attack on our forces. Or, in the words of the Joint Chiefs of Staff:

> ". . . the assured capability of destroying singly or in combination, the Soviet Union and the Communist satellites in Europe as national societies. In combination with theatre nuclear forces . . . the ability to impose adequate punishment on Red China for nuclear or non-nuclear aggression."

The second capability we call "Damage Limitation," i.e., the ability to reduce the weight of the enemy attack by both offensive and defensive measures and to provide protection for our population against the effects of nuclear detonations.

Viewed in this light, our "assured destruction" forces would include a portion of the ICBMs, the submarine-launched ballistic missiles (SLBMs) and the manned bombers. The "damage limiting" forces would include the remainder of the strategic offensive forces (ICBMs, SLBMs and manned bombers), as well as area defense forces (manned interceptors and ,, terminal defense forces (anti-bomber surface-to-air missiles and anti-ballistic missile and passive defenses (fallout shelters, warning, etc.). The strategic offensive forces can contribute to the damage limiting objective by attacking enemy delivery vehicles on their bases or launch sites, provided that our forces can reach their targets before the enemy vehicles are launched. Area defense forces can attrit the enemy's forces enroute to their targets and before they reach the target areas. Terminal defenses can destroy enemy weapons or delivery vehicles within the target areas before they impact. Passive defenses can reduce the vulnerability of our population to the weapons that do impact.

Since each of the three types of Soviet strategic offensive systems (land-based missiles, submarine-launched missiles and bombers) could, by itself, inflict severe damage on the United States, even a "very good" defense against only one type of system has limited value. A "very good" defense against bombers, for example, could be outflanked by targeting missiles against those areas defended solely by anti-bomber systems. This is the principal reason why, today, in the absence of an effective defense against missiles, the large U.S. outlays of the last decade for manned bomber defense, by themselves, now contribute little to our real strategic defense capability. Moreover, the anti-bomber defense system, designed a decade ago, is, itself, vulnerable to missile attack. Thus, a significant capability to limit the damage of a determined Soviet attack requires an integrated, balanced combination of strategic offensive forces, area defense forces, terminal defense forces and passive defenses. Such a balanced combination creates a "defense in depth" with each type of force taking its toll of the incoming weapons, operating like a series of filters or sieves which would progressively reduce the destructive potential of the attacking Soviet nuclear forces.

B. THE CHARACTERISTICS OF PROPERLY BALANCED GENERAL NUCLEAR WAR FORCES

It is generally agreed that a vital first objective, to be met in full by our strategic nuclear forces, is the capability for assured destruction. Such a capability would, with a high degree of confidence, ensure that we could deter under all foreseeable conditions, a calculated, deliberate nuclear attack upon the United States. What amounts and kinds of destruction we would have to be able to deliver in order to provide this assurance cannot be answered precisely, but it seems reasonable to assume that the destruction of, say, 25 percent of its population (55 million people) and more than two-thirds of its industrial capacity would mean the destruction of the Soviet Union as a national society. Such a level of destruction would certainly represent intolerable punishment to any industrialized nation and thus should serve as an effective deterrent.

Once an assured destruction capability has been provided, any further increase in the strategic offensive forces must be justified on the basis of its contribution to limiting damage to ourselves. Here, certain basic principles should be noted. First, against the forces we expect the Soviets to have during the next decade, it would be virtually impossible for us to be able to provide anything approaching perfect protection for our population no matter how large the general nuclear war forces we provide, even were we to strike first. Of course, the number of survivors in a general nuclear war depends on Soviet forces as well as ours. The Soviets have the technical and economic capacity to prevent us from assuring that more than 80 percent of our population would survive a determined attack, possibly less. They can do this by offsetting any increases in our defenses by increases in their missile forces. If we were trying to protect a high percent (e.g., 80 or more) of our population, and if the Soviets were to choose to frustrate this attempt, possibly because they viewed it as threatening their assured destruction capability, the extra cost to them appears to be substantially less than the extra cost to us.

The question of how much we should spend on damage limiting programs can be decided only by carefully weighing the costs against expected benefits.

The second basic principle which must be borne in mind is that for any given level of enemy offensive capability, successive additions to each of our various systems and types of defenses have diminishing marginal value. While it is true that in general the more forces we have, the better we can do, beyond a certain point each increment added to the existing forces results in less and less additional effectiveness. Thus, we should not expand one element of our damage limiting forces to a point at which the extra survivors it yields per dollar spent are fewer than for other elements. Rather, any given amount of resources we apply to the damage limiting objective should be allocated among the various elements of our defense forces in such a way as to maximize the population surviving an enemy attack. This is what we mean by a "balanced" damage limiting force structure.

The same principle holds for the damage limiting force as a whole; as additional forces are added, the incremental gain in effectiveness diminishes. When related to our other national needs, both military and non-military, this tendency for diminishing marginal returns sets a practical limit on how much we should spend for damage limiting programs.

Then, there is the factor of uncertainty of which there are at least three major types -- technical, operational and strategic. Technical uncertainties stem from the question of whether a given system can be developed with the performance characteristics required. Operational uncertainties stem from the question of whether a given system will actually perform as planned in the operational environment. This type of uncertainty is particularly critical with regard to general nuclear war since so little is actually known about the kind of operational environment such a war would create.

The third type of uncertainty is perhaps the most pervasive since it stems from the question of what our opponent or opponents will actually do -- what kind of force they will actually build, what kind of attack they will actually launch, and how effective their weapons will actually be, etc. What may be an optimum defense against one kind of attack may not be an optimum defense against a different kind of attack. For example, within a given budget a NIKE X defense optimized for an attack by 200 ICBMs would defend more cities with fewer interceptor missiles than a defense optimized for an attack by 600 ICBMs. Similarly, a NIKE X defense optimized against an attack by ICBMs with simple penetration aids would have fewer high cost radars than one optimized against an attack by ICBMs with more advanced penetration aids.

In the same way, the effectiveness of our strategic missile forces in the damage limiting role would be critically dependent on the timing of a Soviet attack on U.S. urban targets. These forces would be most effective against the Soviets" bombers and ICBMs if they withheld their attack on our urban targets for an hour or more. Our manned bomber force would be effective in the damage limiting role only if the Soviets withheld their attacks against our urban centers for eight hours or more.

To reduce the technical uncertainties, we rely on painstaking studies and research and development tests; and to hedge against the risks of technical failure, we may support parallel development approaches. We try to cope with the operational uncertainties by repeated testing in a simulated operational environment, but this approach has some very definite limits for general nuclear war types of operations. We hedge against the strategic uncertainties, for example, by accepting a less than optimum defense against any one form of attack in order to provide some defense against several forms of attack, and by purchasing "insurance " by keeping open various options -- to develop and deploy a new bomber, a new interceptor, an anti-missile defense system, etc.

How far we should go in hedging against these various uncertainties is one of the most difficult judgments which has to be made. Analytical techniques can focus the issue but no mechanical rule can substitute for such judgment.

C. CAPABILITIES OF THE PRESENTLY-PROGRAMED FORCES FOR ASSURED DESTRUCTION

In order to assess the capabilities of our general nuclear war forces over the next several years, we must also make some estimates of the size and character of the Soviet forces during the same period. The table below summarizes current estimates of Soviet strategic offensive forces for the mid-1965, -1967 and -1970 periods. United States forces for the same time periods are shown for comparison.

U.S. VS SOVIET STRATEGIC NUCLEAR FORCES

	Mid 1965		Mid 1967		Mid 1970	
	U.S.	USSR	U.S.	USSR	U.S.	USSR
ICBMs[a/]						
Soft Launchers	0	146	0	147-156	0	138-162
Hard Launchers	854	91-116	1054	181-237	1054	272-537
Total	854	235-260	1054	330-395	1054	410-700
SLBMs[b/]	416	130-145	656	146-172	656	194-249
MR/IRBMs						
Soft Launchers		612-616				
Hard Launchers		144-147				
Total	0	756-763	0	756-763	0	756-763
Bombers/Tankers						
Heavy	1250	190-220	1205	170-210	1205	140-180
Medium	425	770-850	76	540-755	72	290-510
Total	1675	960-1070	1281	710-965	1277	430-690

a/ Excludes test range launchers having operational capability of which the Soviets are estimated to have [redacted] in the mid-1965 to mid-1970 period

b/ In addition to the SLBMs, the Soviets will possess submarine-launched cruise missiles whose primary targets we believe are naval and merchant vessels, but which may also be used for shallow penetrations of land areas: mid-1965, 175-207; mid-1967, 247-311; mid-1970, 244-388.

1. Character of Soviet Strategic Forces

Although projections of Soviet forces in the late 1960s and early 1970s are necessarily only informed estimates, development and deployment patterns already apparent have made it possible to identify some broad trends.

At present, about 85 hard SS-7 and SS-8 launchers configured with three silos per site have been identified as operational or under construction; and, the deployment of the SS-7/SS-8 in a soft configuration, with two launchers per site, appears to be leveling off at about 140 launchers. For the soft sites one additional missile is probably available to each launcher allowing a re-fire capability, but there is no evidence that this capability exists for hard launchers. For the hard configurations, silo design hardness is estimated to be in the range of 200 to 400 psi.

The deployment of the SS-8, at one time suspected to have been a very large payload missile, has been curtailed. Analysis has indicated that the payload of the SS-8 missile is similar to that of the SS-7 (approximately 4500 lbs). Most SS-7s probably have three MT warheads. However, a new nosecone with six MT is probably available for missiles entering service this year, and some portion of the existing force will probably be retrofitted with higher yield warheads. The development of a new nosecone with warhead yields higher than three MT for the SS-8 is considered unlikely. A new missile development, beyond the successful SS-7 program and the not-so-successful SS-8 program, has been confirmed. This follow-on to the SS-7 program, designated the SS-9, is expected to become operational in 1965. Probably larger than the SS-7/SS-8, the SS-9's payload is estimated at between 8,000 and 13,000 pounds, with the yield possibly as high as 12-25 MT. We estimate that this missile will be deployed in a hard configuration (one launcher per site).

[redacted]

The Soviets appear to have leveled off their MRBM (1020 n.mi.) and IRBM (2200 n.mi.) programs. This force is deployed in a four launcher per site soft configuration (plus a re-fire capability), a three launcher per site configuration for the hardened IRBMs, and a four launcher per site configuration for the hardened MRBMs. We expect that the warhead yields of Soviet MR/IRBMs will be in the 25 KT to 6 MT range. There is no evidence of a follow-on MR/IRBM development.

The trend in Soviet submarine construction is not very clear. There is some evidence that the construction of the ballistic missile G- and H-class submarines has stopped. Almost all Soviet ballistic missile submarines are equipped with the 350 n.mi. ballistic missile which has a yield of 2 to 3.5 MT. Moreover, the submarine must surface to fire.

[redacted]

By mid-1970, Soviet submarines could have the capability of carrying between 194-249 ballistic missiles.

There is no evidence that the Soviets are developing a new heavy bomber during the late sixties. Barring this possibility, the projected reduction in both the heavy and medium bomber forces will continue into the 1970s. Heavy bomber training in the Arctic has emphasized extended navigational flights into the polar basin. BISON training is oriented towards those activities normally associated with a strike bomber role, and BEAR training has the added feature of reconnaissance specifically oriented against ships in the Atlantic and Pacific. The training of the medium bomber force has been increasingly oriented toward continental or naval rather than intercontinental operations. The increasing age of the heavy bomber and the continued phase-out of the BADGER medium bomber will reduce both the heavy and medium bomber components of Soviet Long Range Aviation. The output of BLINDER medium bombers will probably continue to be shared between long range and naval aviation and it is believed that in 1970 there will be some 200-300 of these bombers in Long Range Aviation. Currently it is estimated that BADGER medium bombers do not figure prominently in Soviet plans for an initial bomber attack against North America. Nevertheless, considering the requirements for Arctic staging and refueling, as well as noncombat attrition factors, it is believed that at present up to 150 BADGERs could arrive over North American target areas on two-way missions. The combat radius of these bombers would limit such attacks to targets in Greenland, Canada, Alaska, and the extreme northwestern U.S. The short range of the BLINDER medium bomber makes it even less suitable than the BADGER for attacks against North America. At present it is estimated that the Soviets could put somewhat over 100 heavy bombers over target areas in the U.S. on two-way missions. However, the use of Soviet heavy bombers in maritime reconnaissance roles leads to the belief that a few of these aircraft might be diverted to this mission.

We had previously estimated that the Soviets were constructing an anti-missile defense system at Leningrad which might be operational as early as mid-1965 and one at Moscow to be operational about mid-1967. While there is still considerable uncertainty, evidence since early summer indicates that the Leningrad system may be redirected with primary capability against aircraft and tactical missiles but little capability against ICBMs. Similar configurations have also appeared at several other locations which would support the view that, if longer range interceptor missiles are associated with these sites, this system is primarily designed to cope with our strategic aircraft threat. Radars at Moscow, which we believe are phased array radars and were previously associated with anti-missile defense, may be associated with the Soviet space tracking efforts.

The SA-2 missile system, a high- and medium-altitude anti-aircraft defense, is already extensively deployed. The SA-3, with a supposed low-altitude capability, will probably be less extensively deployed than previously estimated.

2. Adequacy of Our Programed Missile Forces for Assured Destruction

In evaluating our assured destruction capability, it is important to note that, as shown by the table below, successful attacks on a relatively small number of targets (e.g., 100) will kill large numbers of people and destroy a high percentage of the industrial base.

Cumulative Distribution of Population and Industry by Size of City

	USSR			U.S.		
	Population		Industrial Capacity	Population		Industrial Capacity
City Rank	(Millions)	(% of Total)	(% of Total)	(Millions)	(% of Total)	(% of Total)
1	7.3	3.0	6.2	12.4	5.9	6.6
2	11.1	4.5	13.1	21.4	10.4	12.5
3	12.6	5.2	14.8	28.6	13.6	17.5
10	20.3	8.3	25.0	52.8	25.1	33.1
20	28.8	11.8	36.0	70.1	33.5	44.2
50	44.7	18.3	52.0	97.5	46.5	58.0
100	58.7	24.0	64.0	112.0	57.0	69.6
150	67.0	27.4	69.0	130.0	62.0	75.8
200	73.4	30.0	73.0	136.0	65.0	80.3

(Note: The total population base for the Soviet Union was taken to be the projected 1970 population of 240 million, whereas the total population base for the U.S. was the 1970 projected base of 210 million.)

The destructive potential of various size U.S. attacks on Soviet cities is shown in the following table, assuming both the existing fallout protection in the Soviet Union, which we believe to be minimal, and a new Soviet nation-wide fallout shelter program. For purposes of this table, it is assumed that delivered warheads have a yield of one megaton which is the approximate size of both the , warheads.

Soviet Population and Industry Destroyed
As a Function of Delivered Warheads
(Assumed total population of 240 million;
urban population of 140 million)

Delivered Megatons/ Warheads	Ltd. Urban Fallout Protection: Urban (Millions)	(%)	Total (Millions)	(%)	Nation-Wide Fallout Program: Urban (Millions)	(%)	Total (Millions)	(%)	Ind. Cap. (%)
100	20	15	25	11	16	12	17	7	50
200	40	29	46	19	30	21	32	13	65
400	57	41	68	28	48	35	51	21	74
800	77	56	94	39	71	52	74	31	77
1200	90	65	109	45	84	61	87	36	79
1600	97	70	118	49	92	67	95	39	80

The point to be noted from this table is that 400 one megaton warheads delivered on Soviet cities, so as to maximize fatalities, would destroy 40 percent of the urban population and nearly 30 percent of the population of the entire nation. If, by the 1970s, the Soviets were to provide a full fallout shelter program for their entire population, these percentages would be reduced to about 35 and 21, respectively. In either case, almost three-fourths of the industrial capacity of the Soviet Union would be destroyed.

If the number of delivered warheads were doubled, to 800, the proportion of the total population destroyed would be increased by only about ten percentage points, and the industrial capacity destroyed by only three percentage points. Further increases in the number of warheads delivered produce smaller and smaller increases in the percentage of the population destroyed and negligible increases in the industrial capacity destroyed. This is so because we would have to bring under attack smaller and smaller cities, each requiring one delivered warhead. In fact, when we go beyond about 850 delivered warheads, we are attacking cities of less than 20,000 population.

Based on the projected Soviet threat for the early 1970s, and the most likely planning factors, calculations show that, even after absorbing a Soviet first strike, were we to target all of our already authorized strategic missile force against population centers, it could cause 105 million fatalities and destroy about 78 percent of their industrial capacity -- even without employing our manned bomber force. Indeed, the use of the bombers for this mission (about 600 additional weapons delivered) would increase fatalities by only 10 to 15 million and industrial destruction by only a percent or two. And the bombers would be taking under attack cities of only 10,000 to 20,000 population. The retention of the ATLAS and TITAN I through the early 1970s (which, for reasons I discuss on Page 6 of Appendix A of this memorandum, I recommend phasing out during the current fiscal year) would increase the number of delivered weapons by less than 50 and the assured destruction capability by only a negligible amount.

Within limits, these predictions are not substantially affected by the size of the Soviet ICBM force, which we now estimate could number between 400 to 700 launchers by the early 1970s.

[redacted]

From these data, it is clear that in 1970 only a portion (perhaps half) of the total U.S. ICBM and POLARIS force of 1710 missiles, and none of the bombers, would be required to impose on the Soviets and Communist Chinese unacceptably high levels of destruction. The remainder of our ICBM and POLARIS force and probably all of the bombers must be justified on the degree to which they assist the U.S. defensive forces (interceptor aircraft, fallout shelters, etc.) in limiting damage to our population.

The fact that the programed missile force, alone, more than provides an adequate capability for assured destruction does not imply that the job might not be done more efficiently by bombers only or with higher assurance by a mix of bombers and missiles. To test the first possibility, i.e., using bombers alone, I have examined the comparative cost and effectiveness of four alternative strategic systems -- MINUTEMAN, POLARIS, B-52/SRAM and AMSA. (SRAM is a proposed new air-to-ground missile; AMSA is the new bomber proposed by the Air Force.) Each system was separately targeted to the Soviet urban-industrial complex so as to bring about 150 cities (with one-quarter of the population and two-thirds of the industrial capacity) under attack. Any one of the following forces alone could achieve this objective:

a. MINUTEMAN: Using expected operational factors, 540 operational launchers would be required (total 5-year systems cost would be $2.6 billion 1/). If the Soviets deploy an anti-missile defense system around 15 cities, and if the Soviets assigned 300 of their ICBMs to attack MINUTEMAN, 950 operational launchers would be required (5-year systems cost of $4.5 billion).

b. POLARIS: With expected operational factors, 640 POLARIS A-2/A-3 missiles would be required (5-year systems cost as defined would be $4.0 billion). If the Soviets deploy an anti-missile defense system around 15 cities, an additional 10 POLARIS submarines, carrying an improved missile proposed by the Navy, would be required (the 5-year systems cost for the entire force would be $6.2 billion).

c. B-52/SRAM: Using expected operational factors, 160 operational deployed aircraft would be required (total 5-year systems cost would be $1.8 billion 2/). If the Soviets deployed an improved anti-bomber defense (with the same effectiveness the U.S. Army estimates for a U.S. advanced anti-bomber defense currently under study), then 500 deployed aircraft would be required (at a 5-year systems cost of $5.4 billion).

1/ In this comparison, MINUTEMAN and POLARIS 5-year systems costs consist of the remaining R&D and investment costs (including missile replacement) for FY 1966 through 1970, plus five full years of operating cost.

2/ B-52/SRAM 5-year costs consist of all modification costs (including life extension of the B-52G and H) from FY 1966 through 1970, the development and procurement of SRAM, and five full years of operating costs.

d. AMSA: Using projected operational factors, 100 operational deployed aircraft would be required (total 5-year systems cost would be $6.0 billion, per Air Force estimates, or $7.2 billion per OSD cost review). If the Soviets deploy the improved anti-bomber defense (cited above) and if only 50 percent of the aircraft could be maintained on alert, then 350 operational deployed aircraft would be required (at a 5-year systems cost of $16 billion per Air Force estimates or $18 billion per OSD cost review).

The 5-year systems costs of the required deployments of these four systems are summarized below:

(In Billions)

	Existing Soviet Defenses	Improved Soviet Defenses
MINUTEMAN	$ 2.6	$ 4.5
POLARIS	4.0	6.2
B-52/SRAM	1.8	5.4
AMSA	6.0 - 7.2	16 - 18

It is clear that AMSA would be the most expensive way of accomplishing the task.

There are several arguments sometimes used to support the case for a missile-bomber mix:

a. <u>Complicating the Enemy's Defensive Problem</u> - As long as we have strategic aircraft, the enemy cannot effectively defend against ballistic missiles without concurrently defending against aircraft and their air-to-surface missiles (ASM). Conversely, defense against aircraft without concurrent defense against ballistic missiles also leaves him vulnerable. At present, the Soviets appear to be devoting the equivalent of $6-8 billion per year, including 500,000 men, on their anti-bomber defenses. Without a bomber threat, these resources could be reallocated to their strategic retaliatory forces, anti-missile defenses, or some other military program that might cause us more trouble. Calculations suggest that, by continuing to maintain a bomber/ASM threat, we can force the Soviets to spend about 15-25 cents or more on terminal bomber defense for every dollar they would spend on ABM.

However, this factor does not necessarily argue for a large bomber force. Most of the major elements of cost in an anti-aircraft defense system (e.g., the ground environment and part of the interceptor force) are quite insensitive to the size of the opposing bomber force. The requirement for surface-to-air missiles is a function of the number of targets to be defended. Since the Soviets will not know in advance which targets our bombers would attack, they have to continue to defend all of them and their expenditures for air defense are likely to be about the same whether we have a relatively small or a large force of bombers.

b. Hedging Uncertainties In the Dependability of Our Strategic Offensive Forces - There are four relevant factors which determine the dependability of our strategic offensive forces: the alert rate, pre-launch survival rate, reliability, and penetration. The alert rate is the proportion of the operational force which can immediately respond to an execution order; the pre-launch survival rate is the proportion of the alert operational force which is expected to survive enemy attack in operating condition; the reliability rate is the probability that the system will launch, proceed to target areas as planned, and detonate its weapon, exclusive of enemy defensive action; and the penetration rate is the probability that a reliable system will survive enemy defenses to detonate its warhead. The readiness (alert rate) and reliability of our strategic missile forces is good and improving. We are providing substantial amounts of money for an extensive testing program. There can be no reasonable doubt that, for the time period in question, the readiness and reliability of our MINUTEMAN and POLARIS systems will be fully satisfactory.

With regard to survival, it is highly unlikely that the Soviets, even by the early 1970s, would be able to destroy any significant number of POLARIS submarines at sea. I am convinced that they do not have this capability now. Nor is it likely that they would be willing to commit the large amount of resources required to achieve an effective capability in the future, especially in view of the range of our POLARIS missiles.

Recognizing that the Soviet missile force, estimated at 400-700 launchers in the early 1970s, will face over 1,000 hardened and dispersed U.S. ICBMs, I believe that our land-based missiles also have high survival potential.

On the other hand, I am not convinced that the survival potential of aircraft is as good as POLARIS or MINUTEMAN. If, for any of a number of reasons, they are not launched within the warning time, they would be caught on their home bases by an enemy missile attack. If the bombers are not to be completely dependent on warning, they must be widely dispersed. Today, B-52s and B-58s are dispersed only to a squadron level (15 aircraft) because, in part, greater dispersal is both difficult and expensive. Furthermore, the extent to which assured command, control and communications is possible under widespread dispersal, remains to be determined.

The Air Force proposal to disperse a force of 200 AMSAs to 400 bases would still represent a far lesser degree of dispersal than that achieved by MINUTEMAN -- measuring degree of dispersal by the amount of our investment in weapon systems per independent aiming point presented to the Soviets. Leaving aside (1) the fact that the Soviets would want to target many of these bases anyway because they contain our defensive and other forces, (2) our investment other than AMSA in these bases, and (3) the undesirability of dispersing strategic bombers to civil airfields near cities, the 5-year system cost of AMSA, per soft point, would be $22 to $29 million, which is three or four times the cost of an individual MINUTEMAN hard point.

With regard to penetration, the deployment of an effective Soviet anti-ballistic missile system could degrade the capability of our missiles. However, it appears unlikely that the Soviets will deploy in this decade or the early 1970s a system having the potential effectiveness of NIKE X. And, even if they were to deploy ABM defenses, our penetration aids and multiple warheads should keep the "entry price" of missile attacks against defended targets within tolerable limits. ("Price" is defined as the number of missiles that must be placed over the defended target area to ensure that the target is destroyed.)

Aircraft will also face penetration difficulties. Many studies have shown that an effective anti-bomber defense is a necessary ingredient to an anti-missile defense and that the two should have an "inter-locked" deployment to avoid obvious vulnerabilities. The cost of effective anti-bomber defense appears to be about one-fourth of the cost of an anti-missile defense.

In summary, I see little merit to the argument that a new aircraft development is required to hedge uncertainties in the dependability of our missile force.

Other arguments are also frequently advanced in favor of the bomber -- flexibility, reuseability, "show of force" in a crisis, etc. Each of them has some merit but we would not support a bomber force for those reasons alone. I am not convinced that further large investments in this type of insurance (for example, $8.9 to $11.5 billion for the Air Force proposed AMSA program)can be justified for assured destruction.

D. CAPABILITIES OF THE PRESENTLY-PROGRAMED FORCES FOR DAMAGE LIMITATION

The ultimate deterrent to a deliberate Soviet nuclear attack on the United States is our clear and unmistakable ability to destroy them as a viable society. But once deterrence has failed, whether by accident or miscalculation, a choice must be made as to how our forces should actually be targeted in order to reduce damage to ourselves to the maximum extent possible.

I believe it evident from the preceding discussion that the employment of our entire strategic offensive force so as simply to maximize Soviet urban damage would not represent an optimum use of this capability in the light of our objective to limit damage to the U.S. As noted earlier, when the number of warheads delivered on Soviet cities passes beyond about 400, we begin to encounter rapidly diminishing returns in the amount of additional destruction achieved. For example, if we had fired our strategic missiles against Soviet cities, our bomber force directed against Soviet military targets would produce, through fallout, simply as a by-product of their attack, about the same number of fatalities as they would produce if targeted against the remaining Soviet cities.

The utility of the strategic offensive force in the damage limiting role, however, is critically dependent on the timing of the Soviet attack on U.S. urban targets. For example, if the Soviet missile attack on U.S. cities were to be delayed for one hour or more after the attack on U.S. military targets, our strategic missiles, which can reach their targets in the Soviet Union in less than one hour, could significantly reduce the weight of that attack by destroying a large part of the withheld Soviet forces before they were launched.

If the Soviet attack on cities were to be delayed for eight hours or more after the Soviets attack our military targets, our bomber force could also contribute to this objective. However, if the Soviets were to launch their attack against our urban areas at the beginning of a general nuclear war, our strategic offensive forces would have a greatly reduced value in the damage limiting role. Their contribution in that case would be limited to destruction of Soviet residual forces -- unlaunched strategic missiles and bombers, re-fire missiles, and any other strategic forces the Soviets might withhold for subsequent strikes.

Since we have no way of knowing how the Soviets would execute a nuclear attack upon the United States, we must also intensively explore "defensive" systems as means of limiting damage to ourselves. Conversely, because of the critical nature of this uncertainty, we should also hedge against the possibility that we may be presented with an opportunity to destroy at least some of the Soviet offensive forces before they are launched; and this means that we must include in our strategic offensive forces some capability for this purpose. The problem here is to achieve an optimum balance among all the elements of the general nuclear war forces, particularly in their damage limiting role. This is what we mean by "balanced" defense.

Although a deliberate nuclear attack upon the United States by the Soviet Union may seem a highly unlikely contingency in view of our unmistakable assured destruction capability, it must receive our first attention because of the enormous consequences it would have.

To appreciate fully the implications of a Soviet attack on our cities, it is useful to examine the assured destruction objective from the Soviet point of view, since our damage limiting problem is their assured destruction problem and our assured destruction problem is their damage limiting problem. The following table is similar to the one used earlier in this memorandum to illustrate the assured destruction problem from our point of view. It shows the potential number of Americans killed as a function of the number of warheads delivered on the United States in a Soviet assured destruction effort. The yield of each warhead is assumed to be 10 MT. As in the case of the counterpart table, U.S. fatalities are calculated under conditions of a limited, as well as a full, nation-wide fallout shelter program.

United States Population and Industry Destroyed
As a Function of Delivered Warheads
(Assumed total 1970 population of 210 million;
urban population of 150 million)

Delivered Warheads (10 MT)	Ltd. Fallout Protection Urban (Millions)	(%)	Total (Millions)	(%)	Nation-Wide Fallout Program Urban (Millions)	(%)	Total (Millions)	(%)	Ind. Cap. (%)
100	79	53	88	42	49	33	53	25	39
200	93	62	116	55	64	43	74	35	50
400	110	73	143	68	80	53	95	45	61
800	121	81	164	78	90	60	118	56	71

Several points are evident from the above table. First, it is clear that, with limited fallout protection, a Soviet attack consisting of even 100 delivered warheads, each with a ten-megaton yield, would cause great loss of life -- 79 million fatalities in the cities attacked and 88 million fatalities or almost 42 percent of the total population, nation-wide. The high level of fatalities from 100 delivered warheads is more a function of the heavy concentration of population in our large cities than of the greater yield assumed for the Soviet warheads. The diminishing return simply reflects the fact that smaller and smaller cities would have to be targeted as the scale of the attack is raised. Second, the table clearly demonstrates the distinct utility of a nation-wide fallout shelter program at all levels of attack. Third, 100 delivered warheads would destroy about 39 percent of our industrial capacity. Each successive doubling of the number of delivered warheads of this size would increase the destruction of our industrial capacity by only 10 percentage points.

In order to assess the potential of various damage limiting programs, we have tested a number of "balanced" defense postures at different budget levels. These postures are designed to defend against a Soviet threat in the 1970s consisting of 160 soft ICBM launchers, 460 hard ICBM launchers, 230 submarine-launched ballistic missiles, 140 heavy bombers and 300 medium bombers. These figures lie within the range of the estimates for mid-1970, shown on Page 7 of the memorandum.

We examined the total destruction potential of the Soviet inventory, assuming that their soft ICBMs and bombers are assigned against our military targets and their hard ICBMs, SLBMs, and some bombers are assigned against our cities. In order to illustrate the critical nature of the timing of the Soviet attack, we used two limiting cases. First, we assumed that the Soviets initiate nuclear war with a simultaneous attack against our cities and military targets. Second, we assumed that they delay their attack against our cities until after the U.S. retaliates against their military targets. (We have assumed solely for the purpose of this analysis that the presently programed U.S. strategic retaliatory forces would be "earmarked" for the assured destruction objective and that only the "additional" forces would be used for damage limiting.) Obviously, these are two extreme cases and do not reflect all of the other more complex, and more likely, possibilities which lie between. Finally, we assumed that all new systems will perform essentially as defined, since our main purpose here is to gain an insight into the overall problem of limiting damage.

The results of this analysis are presented in the table below.

Estimated U.S. Fatalities for Several Damage Limiting Programs

U.S. Damage Limiting Programs	Millions of U.S. Fatalities (Based on 1970 population of 210 million)	
Budget	Early Urban Attack	Delayed Urban Attack
$ 0 billion	163	163
5 billion (Civ. Def. Only)	120	120
10 billion	118	82
20 billion	96	59
30 billion	78	41

Balanced allocations of expenditures among the several components of a damage limiting posture for the four illustrative budget levels are shown in the next table.

(Incremental investment plus cost of 5-years' operation, in billions)

Total Budget	Civil Defense	Missile Defense	Bomber Defense	Submarine Defense	Counterforce Missiles a/	Counterforce Bombers
$ 5.2	$5.2	$ 0	$ 0	$ 0	$ 0	$0
10.0	5.2	0	1.7	.1	3.0	0
20.0	5.2	8.8	2.8	.2	3.0	0
30.0	5.2	17.1	4.4	.3	3.0	0

a/ Existing programed forces can probably meet this requirement.

For a budget level of $5.2 billion, a complete fallout shelter system would be the most effective component of a balanced damage limiting program against large attacks. At none of the budget levels examined would it pay to spend less for fallout protection. Indeed, a transfer of resources from the fallout shelter system to other defense systems would result in a substantially less effective defense posture. This is borne out in the following table:

U.S. Damage Limiting Program (Cost in Billions)		Millions of U.S. Fatalities (Based on 1970 population of 210 million)	
Total Budget	Civil Defense	Early Urban Attack	Delayed Urban Attack
$ 0	$0	163	163
5	5	120	120
10	0	162	126
10	5	118	82
20	0	142	84
20	5	96	59
30	0	126	63
30	5	78	41

The foregoing table indicates that, for the same level of survivors, any damage limiting program which excludes a fall-out shelter system would cost at least two or three times as much as a program which includes such a system, even on the favorable assumption that the Soviets would not exploit our lack of fallout protection by surface bursting their weapons upwind of the defended areas. Fallout shelters have the highest priority because they decrease the vulnerability of the population to nuclear weapon detonations under all types of attacks, including collateral damage by fallout from attacks limited to U.S. military targets. Against a wide range of urban/military attacks, a complete fallout shelter system alone would save 20 to 25 percent of our population and should therefore be a first component of any larger damage limiting program.

At the $20 and $30 billion budget levels, the bulk of the additional funds go to missile defense. However, a high confidence in the effectiveness of the missile defense system must be assured before commitment to such large expenditures would be justified. Moreover, at the higher budget levels, missile defenses must also be interlocked with local bomber defenses in order to avoid having one type of threat undercut a defense against the other. The exact combination of these two defense systems requires further study.

At each budget level above $5.2 billion, about $3 billion would be allocated for strategic missiles targeted against Soviet offensive forces (presently programed forces are probably sufficient to provide these missiles). United States missiles which destroy Soviet vehicles before launch show a very high utility for their cost in the damage limiting role up to the point where one reliable missile has been targeted against each Soviet Long Range Aviation base and missile site. New missile systems, which we believe could be developed for deployment in the 1970s, show even higher utility. The utility of this type of force in limiting damage depends entirely on whether or not our forces arrive before the enemy's nuclear delivery vehicles are launched against our cities. But in this respect, missiles have a better chance than aircraft.

Nevertheless, we have carefully examined the effectiveness of bombers in destroying various classes of enemy targets. In one analysis we compared two strategic aircraft, the AMSA and the B-52/SRAM, and two strategic missiles, MINUTEMAN II and an improved missile for the 1970s. This improved missile, which could be developed and deployed within the same time frame as the AMSA and which is already under study by the Air Force, would be able to carry multiple, independently-directed re-entry vehicles enabling a single missile to attack several different targets. The results of this analysis are shown in highly summary form in the following table.

THE EFFECTIVENESS AND COSTS OF ALTERNATIVE STRATEGIC WEAPON SYSTEMS

	AMSA		B-52/SRAM		MM II (Imp. Guid.)	Imp.Cap. Missile
Force Level	200		250		1000	600
Five Yr. Costs 1/ ($ Billions)	8.9-11.5		3.0		4.5	10.0
Weapons per Carrier						
Bombs	4	0	4	0		
Missiles	9	18	9	18	1	7
Weapons on Target	1140	1476	820	1134	675	2520
Cost/Target Des. ($ Millions)						
Soft	8.9-11.5	6.7-8.6	4.4	3.3	6.7	4.0
100 psi	8.9-11.5	6.7-8.6	6.3	6.4	6.7	4.0
300 psi	9.4-12.1	7.0-9.1	9.1	12.0	7.2	4.5

1/ The five-year systems costs consist of the RDT&E and investment beyond FY 1965 and the full five-years' operations.

Throughout this analysis we have used essentially the same planning factors used by the Air Force, i.e., alert rates, survival rates, CEP, etc. The assumptions underlying the table were chosen to be representative for most military targets. For example, at this time, we estimate that most nuclear target threats in the U.S.S.R. will not be protected by an anti-ballistic missile defense during the next five to ten years.

Recognizing that there are uncertainties in all of the assumptions, as well as in the planning factors used, I believe that this table does demonstrate clearly at least one important point, namely, that there are less costly ways -- including other aircraft -- of destroying military targets than by developing and deploying a new AMSA. The B-52/SRAM, for example, is much more competitive with missiles than AMSA against soft targets. Moreover, the advanced avionics proposed for the AMSA could also be employed with the B-52/SRAM, increasing the accuracy of the missile delivery system by about threefold, i.e., to the CEP assumed for the AMSA. This would cost an additional $1.2 billion. But against the 300 psi hardened targets, the cost per target destroyed for a B-52/SRAM would be reduced to between $4.5-$6.5 million, compared with the $7 to $12.1 million shown for AMSA.

With regard to the SLBM threat, only nominal funds were allocated to extra anti-submarine defense for damage limiting at each budget level. Full advantage would be taken of the ASW capabilities we already have for defense of the fleet and shipping. The currently projected Soviet SLBM threat will not be particularly effective in comparison with our own POLARIS. Deployment of an improved SLBM force by the Soviets need not mean that we should necessarily respond with improved anti-submarine forces, since a terminal anti-ballistic missile defense could also deal with a SLBM attack.

There remains the possibility of a small nuclear attack on the United States either accidentally or deliberately, possibly by a nation other than the Soviet Union. Since the next decade will probably see a proliferation of nuclear weapons and strategic delivery systems, and remembering that a single thermonuclear weapon could kill as many Americans as were lost in the entire Second World War, this may become an important problem. Accordingly, we have undertaken a number of studies in that area. Our preliminary conclusion is that a small, balanced defense program involving a moderate civil defense effort and a very limited deployment of a low cost configuration of the NIKE X system (which is technically feasible without commitment to a full-scale deployment) could, indeed, significantly reduce fatalities from such an attack.

In summary, several important conclusions may be drawn from our analysis of the damage limiting problem:

1. With no U.S. defense against a nuclear attack in the early 1970s, the Soviet strategic offensive forces would be able to inflict a very high level of fatalities on the United States -- about 160 million or 75 percent of the total population.

2. A nation-wide civil defense program costing about $5 billion could reduce these fatalities to about 120 million.

3. A large, balanced damage limiting program for a $30 billion 5-year cost could reduce fatalities associated with an early urban attack to about 80 million.

4. There is no defense program within this general range of expenditures which we could expect with confidence to reduce the fatalities to a level much below 30-40 million even if the Soviets delayed their attack on our cities, or much below 60-75 million if they attack our cities on the first strike.

However, we have thus far not taken into account a most important factor -- possible Soviet reactions to our damage limiting initiatives which could serve to offset their benefits. For example, assume that we had already spent $20 billion for a balanced, damage limiting posture, as described above, expecting it would ensure survival of 54 percent of our population in the event of a Soviet first strike against our cities. Assume further that we then decided to spend another $10 billion to raise the proportion surviving to 62 percent. If the Soviets choose to offset this increase in survivors, they should be able in the 1970s to do so by adding about 250 improved ICBMs with penetration aids, at a cost of perhaps about $6 billion. Similarly, if we increased our damage limiting expenditures by still another $10 billion, to $40 billion, in order to raise the proportion of the population surviving from 62 to 68 percent, the Soviets could offset our action by adding another increment of 200 improved ICBMs to their force, at a cost of perhaps another $5 billion.

Thus, at each successively higher level of U.S. survivors the ratio of our costs for damage limitation to their costs for assured destruction becomes less and less favorable for us. Indeed, at the level of spending required to assure ourselves 80 percent survivors in a large Soviet first strike against our cities, we would have to spend on damage limiting forces about four times what the Soviets would have to spend on damage creating forces, i.e., <u>their</u> assured destruction forces.

This does not necessarily mean that the Soviets would actually react to our damage limiting initiatives, but it does underscore the fact that beyond a certain level of population surviving the cost advantage lies increasingly with the offense, and this fact must be taken into account in any decision to commit ourselves to large outlays for additional defensive measures. There is little doubt that it is technically and economically feasible for the Soviets to defeat our attempts to achieve high percentages of survivors in a large nuclear attack. If we were to choose to aim for a high percentage, a level at which the cost leverage is quite unfavorable, and if the Soviets were to choose to run the race, then we might find ourselves devoting very large amounts to damage limiting measures and realizing very little in return as far as an effective defense against a large deliberate Soviet attack is concerned.

E. RECOMMENDATIONS ON MAJOR ISSUES IN THE GENERAL NUCLEAR WAR PROGRAMS

In this section, I shall attempt to summarize my views on the six major issues involved in the general nuclear war programs. A more detailed statement of my views, plus those of the Joint Chiefs of Staff and Service Secretaries, may be found in Appendix A.

1. Development and Deployment of a New Manned Bomber

I believe it is clear from the foregoing discussion that it is difficult to make a good case, at this time, for the development and deployment of a very expensive new manned bomber such as the AMSA proposed by the Air Force. Although the destructive potential of our missile forces alone provides a most persuasive deterrent to a Soviet attack on the United States, it may, nevertheless, be wise, for the reasons I have already discussed, to provide an option for maintaining some manned bombers in our forces indefinitely. This we propose to do.

There are at least three other alternatives available to us, in addition to the development of the AMSA, which would preserve the option to maintain a force of strategic bombers into the 1970s. These are: (a) the retention of late model B-52s and the improvement of their attack capabilities; (b) the procurement of a strategic version of the F-111 (B-111); and (c) the initiation of advance development work on long lead time components of new combat aircraft.

With appropriate maintenance and modification, most of the current B-52s can be maintained in safe, effective operation at least through the early 1970s. I recommend that $339 million be included in the

FY 1966 budget for this purpose and that another $930 million be approved for planning purposes in the FY 1967-1970 programs. These funds would permit us to continue our program of structural modifications for the B-52s and would make it possible to keep the B-52Cs through Fs (current total inventory numbering 336 aircraft) in the force until 1970-1972; and the B-52Gs and Hs (current total inventory numbering 287 aircraft) beyond end FY 1975.

The 41 B-52Bs still in the force should be completely phased out by the end of fiscal year 1966 and the force structure reduced by one wing. These are the oldest active B-52s and we would have to spend about $70 million over the next few years to keep them in safe operating condition. Including operating costs, their phase out could produce a saving of about $200 million during the FY 1966-1970 period, without any significant effect on our strategic offensive capability.

The latest series of B-52s, the Gs and Hs, could also be modified to incorporate the Short Range Attack Missile (SRAM) proposed by the Air Force for the AMSA. Without extensive new avionics, the SRAM carried by a B-52 would have an accuracy approaching feet against known fixed targets and could be launched as far away from the targets as 60 n.mi., outside the range of local defenses. Preliminary estimates show that the costs of development and the additional structural modifications required for SRAM deployment with the B-52s would amount to about $3 million per aircraft. Although these aircraft have some limitations in dispersal capability, speed, damage assessment and ride quality when compared with a B-111 or an AMSA, I believe that for the next ten years this option would provide, at the lowest possible price, adequate insurance as a hedge against unforeseeable degradations of our assured destruction capability. Accordingly, I recommend approval to initiate a project definition phase for SRAM at a cost of $5 million in FY 1965 and about $15 million in FY 1966; an additional $14 million will be required for development in FY 1966 (a total of $29 million) and $67 million in FY 1967-1970.

A strategic version of the F-111, with but minor modifications, could carry up to five SRAMS, an equivalent loading of bombs, or a combination of both. Its speed over enemy territory could be supersonic at high altitudes and high-subsonic at low altitudes. While a B-111 force would have to place greater reliance on tankers than an AMSA force, its range (considerably better than the B-58), its target coverage, and its payload-carrying capability would be sufficient to bring under attack a very large percent of the Soviet urban/industrial complex. Since this aircraft is already nearing production, a strategic version could be made available within two or three years after approval. Therefore, no decision is necessary at this time.

The AMSA, as presently envisioned by the Air Force, would incorporate the payload-carrying capabilities of the B-52 and the speed/altitude characteristics of the F-111. Its takeoff gross weight would be in the 350,000 pound class and it would require the development of a new engine and new avionics, as well as the SRAM. Considering the other alternatives available, I do not believe we are now ready to go ahead with development.1/ But, I do believe it is desirable to keep open the option for a new heavy bomber in the strategic forces after the retirement of the B-52s.

1/ Secretary Zuckert, in his memorandum transmitting the AMSA proposals to me, noted that the Air Force intends:

> ". . . to complete, prior to the initiation of the Project Definition Phase, a prerequisite phase which will further refine our systems evaluation. This phase will include further evaluation of an advanced strategic aircraft against the TFX, the stretched TFX, and a growth version of the TFX incorporating advanced engines. In addition, AMSA vehicles in the 200,000 to 300,000 pound weight class will be further investigated. Aircraft configured for subsonic penetration only will be compared with designs having supersonic high altitude performance as well as low-level capability. Each system configuration will be assessed in terms of performance, cost, schedule, military effectiveness, complexity, and development risks."

page 29 denied in total

silos, commencing in July 1966 instead of January 1966, as previously approved, in order to reflect a six month slippage in the program and to smooth out the early buildup rate. The total cost of the retro-fit program through 1970 will amount to $1.3 billion (550 silos by end FY 1970) in addition to the $1.1 billion spent on MINUTEMAN II development. The MINUTEMAN II, with all the improvements I am recommending, could increase target destruction capabilities by at least a factor of two compared to a MINUTEMAN I force of the same size. The recommended improvements include: a new guidance improvement program; the development of a new re-entry vehicle (the) which would have much smaller re-entry errors as well as a larger yield warhead; and a precise warhead election system which would permit a single MINUTEMAN II to deliver three re-entry vehicles to geographically separated targets.

The guidance improvement program and the new re-entry vehicle promise to reduce the overall CEP of the MINUTEMAN II to around feet (half the present CEP) and give the missile a 90 percent probability of destroying targets hardened up to psi. The "post boost control system" would greatly increase the "kill" capability of the recommended MINUTEMAN force against soft targets, many of which require no more than for their destruction. The R&D and investment cost of the guidance improvement program is estimated at $35 million; the RDT&E cost of the new re-entry vehicle at $89 million, exclusive of the flight test program; and the precise warhead ejection system at $125 million, exclusive of the flight test program. (A version of this system is already under development for the ejection of penetration aids as part of a $31 million program in FY 1965 and $52 million in FY 1966.

Along with MINUTEMAN, we should also consider the other strategic missile programs. To prepare for the possibility that the Soviet Union may deploy an effective anti-missile defense system around its urban/industrial areas, I recommend the inclusion in the FY 1966 budget of $35 million to begin development of a new POLARIS B-3. We intend to initiate a project definition for this missile during FY 1965. The B-3 would incorporate improved accuracy and payload flexibility permitting it to attack a single, heavily defended urban/industrial target, or a single hardened point target, or several undefended targets which might be separated by as much as 75 miles. Since we are uncertain about both the ultimate shelf life of the present POLARIS missiles and the schedule of deployment of a Soviet ABM system, the pace of the B-3 development has not been precisely established at this time. Total development costs of the B-3 missile may approximate $900 million; and the total cost of a 41 Polaris submarine force, including, for example, 22 submarines carrying the B-3 missile could total $2.5 billion.

Finally, in view of the fact that we will have 800 MINUTEMAN and 416 POLARIS in the operational forces by the end of the current fiscal year, I believe we can safely phase out the ATLAS Es and Fs and TITAN Is by that time, at a saving of about $515 million in the FY 1966-1970 period. These older, liquid fuel missiles are very costly and difficult to maintain on an alert status. Moreover, on the basis of their present operational factors, they represent less than 50 delivered warheads.

3. The Overall Level of the Anti-Bomber Defense Program

Our present system for defense against manned bombers was designed a decade ago, when it was estimated that the Soviets would build a force capable of attacking the United States with many hundreds of heavy bomber aircraft. This threat did not develop as estimated. Instead, the major threat now confronting the United States is the Soviet ballistic missile. With no defense against the ballistic missile and only the beginning of a viable civil defense posture, our anti-bomber defenses could operate on only a small fraction of the Soviet offensive forces in a determined attack. A balanced defense requires a major reorientation of our effort -- both within anti-bomber defenses and between anti-bomber and anti-missile defenses.

The characteristics of a balanced defense have already been discussed. For defense against the diminishing bomber threat, our present forces are quantitatively excessive in relation to their cost and effectiveness. I therefore recommend:

a. The phaseout of 9 National Guard F-89 squadrons along with the transfer of 9 active F-101 squadrons to the Air National Guard by end FY 1967, and the phaseout of 9 active F-102 squadrons by end FY 1969 (1 in FY 1965, 4 in FY 1968, and 4 in FY 1969)--for a FY 1966-70 saving of $300-$350 million.1/ Studies made by the North American Air Defense Command indicate that in 1970 the fatalities from a Soviet attack, after withdrawal of these squadrons would be no more than 1.5 to 5 million higher than they would be if the squadrons were retained--i.e., the fatalities might be 48 to 50 percent of the population instead of 47 percent.

1/ The Joint Chiefs of Staff, less Chief of Staff, Army, recommend that the intercept force be retained as previously approved.

b. The phase out of the Devline extension aircraft and the offshore radar picket ships beginning in FY 1965, as proposed by the Navy -- for a FY 1966-1970 saving of $266 million ($69 million in FY 1966). 1/

c. The reorganization of the air defense surveillance system, as proposed by the Air Force, entailing the phase out of 16 prime radars, 32 height finder radars and 9 gap filler radars by end FY 1967 -- for a FY 1966-1970 saving of $111 million. 2/

The funds saved by these actions can be better applied to the improvement of the qualitative effectiveness of our anti-bomber defense forces. To this end, I recommend:

a. The initiation of development of an improvement to the HAWK system and continued advanced development of a new, improved surface-to-air missile system for both continental and overseas theatre air defense, at a FY 1966 cost of $24.5 million. 2/

b. The inclusion of about $28 million in the FY 1966 budget for SAGE/BUIC III, an improved ground environment system for air defense control. 3/

c. Continued systems study of an Airborne Warning and Control System and component development in an Over-land Radar Technology program to augment land-based surveillance and control systems for both continental and tactical air defense. 2/

4. The Production and Deployment of a New Manned Interceptor.

On the basis of the analysis in the preceding sections of this memorandum, it is clear that the production and deployment of a new manned interceptor in a balanced defense program should be considered only if we were to increase significantly our damage limiting program, including the deployment of an anti-missile defense system and a nation-wide fallout shelter system. Indeed, it is not at all clear at this time that a new manned interceptor would be preferable to a new advanced surface-to-air missile system, the continued development of which I have recommended above. Nor is it clear that the F-12A, already developed, is preferable to an interceptor version

1/ The Joint Chiefs of Staff, less the Chief of Naval Operations, do not concur in this recommendation.
2/ The Joint Chiefs of Staff concur in this recommendation.
3/ This plan meets the objectives sought in the JCS recommendation on this subject.

of the F-111. Our analyses indicate that against subsonic bombers, the F-111 would be preferable at smaller budget levels while the F-12A would be preferable only at high budget levels. In any event, at higher levels of damage limiting expenditure the anti-bomber and anti-missile defenses must be interlocked and proceed in parallel.

At this time, I recommend the provision of $5 million in the FY 1966 budget for the further development of electronics equipment for the YF-12A, and the deferral of a decision on the production and deployment of either the F-12A or the F-111 for the interceptor mission.1/ The recommended program will retain the option of future deployment of either, or both, of these interceptors.

5. The Production and Deployment of the NIKE X Anti-Missile System

During the past year, we have greatly expanded our knowledge of anti-missile defense with regard to both the cost and effectiveness of alternative deployments and the technical aspects of the system. The Army has developed three basic systems configurations which differ primarily in the number and kind of radars utilized:

a. The so called HI-MAR configuration which includes one high cost Multifunction Array Radar (MAR) and about two single-face low cost Missile Site Radar (MSR) for each urban area defended. This configuration provides the most effective defense against a large, technologically sophisticated attack per urban area defended, but it is the most costly for a given number of areas.

b. The LO-MAR configuration which includes, on the average, one MAR for every three urban areas and one double-face MSR and two single-face MSR for each urban area defended. For a given level of expenditures, recent Army studies indicate that the LO-MAR configuration would possibly maximize survivors against a moderately sophisticated attack and would be clearly superior to a HI-MAR configuration against a smaller or less sophisticated attack.

c. The NO-MAR configuration which includes only MSR radars in the same combination as the LO-MAR configuration. This would be the lowest cost configuration per urban area defended but it would not be effective against a large, sophisticated attack.

1/ The Joint Chiefs of Staff recommend finding in FY 1966 (procurement of either 18 F-12As or 18 F-111s) to retain the option for future deployment of an advanced interceptor.

A comparison of representative deployments of the three configurations -- the number of urban areas protected, population in the protected areas and development and production costs -- is shown in the table below.

SELECTED NIKE X DEPLOYMENT ALTERNATIVES*

	Defended Urban Areas	R&D & Proc Costs ($ Bil)	Initial Operational Capability
HI-MAR			
I	13	10.9	Sep 69
II	23	17.7	Mar 72
III	30	25.4	Dec 73
LO-MAR			
I I	11	6.8	Sep 69
II	20	11.7	Mar 71
IV	47	19.8	Mar 73
NO-MAR			
I	11	4.5	Sep 69
IV	50	10.9	Mar 73
VI	102	14.6	Mar 75

*Other alternative deployments and details on costs and configurations are shown in Appendix A.

If we wished to start deployment at the earliest possible date, first quarter FY 1970, we would have to include about $200 million in the FY 1966 budget for production, in addition to more than $400 million for continued development. However, in view of the continuing uncertainties concerning the preferred concept of deployment, the relationship of the NIKE X system to other elements of a balanced damage limiting effort, the prospects for an effective nation-wide fallout shelter system, and the nature and effect of the Soviet reaction to a NIKE X deployment, I do not believe a decision on production should be made at this time. But, I do recommend that a total of $400.0 million be provided for NIKE X in the FY 1966 budget: $390.0 million to continue development of the system at an optimum rate, and $10 million for production planning.1/ The question of production and deployment of the NIKE X

1/ The Joint Chiefs of Staff recommend that $200 million pre-production funds be allocated in FY 1966 to protect the option to achieve an initial operational capability in October 1969.

system should be reexamined next year. Deferment of the decision to FY 1967 would permit start of deployment in late FY 1970.

6. The Construction of Fallout Shelters for the Entire Population

Our analysis of the damage limiting problem makes it crystal clear that an effective nation-wide fallout shelter system would provide the greatest return for the money expended. The Executive Branch has recommended such a program to the Congress three years running but the required legislation authorizing the shelter development program, without which we cannot provide a complete nation-wide system, has not been enacted. Accordingly, I recommend:

a. That the Executive Branch undertake a major effort to inform the Congress of the relationship between a shelter development program providing full fallout protection for the population and the other elements of a "damage limiting" program before such legislation is again transmitted to the Congress.

b. That [illegible] million be included in the FY 1966 budget to expand the present shelter survey program to include a survey of homes and other small private buildings and to finance a more thorough evaluation of existing shelter characteristics and supplies.

c. That $15 million be included in the FY 1966 budget to increase the Civil Defense R&D program, primarily to evaluate shelter construction techniques, to develop a thermal counter-measure system, and to establish a technical basis for post-attack recovery.

d. That other elements of the presently approved program be continued at a FY 1966 level to be determined during the current budget review.

* * * *

My recommendations on other issues in the general nuclear war programs are included in Appendix A. Appendix B contains selected fiscal and force structure summaries of the recommended programs. Table 1, immediately following, summarizes the Strategic Offensive Forces which I am recommending.

TABLE 1

RECOMMENDED AND SERVICE PROPOSED[a/][b/] STRATEGIC OFFENSIVE FORCES
(End Fiscal Year)

	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970
Bombers [c/]										
B-52	555	615	630	630	630	600 (630)	600 (630)	600 (630)	600 (630)	600 (630)
B-EB-47	900	810	585	450	225					
B-58	40	80	80	80	80	80	78	76	74	72
Total Bombers	1495	1505	1295	1160	935	680 (710)	678 (708)	676 (706)	674 (704)	672 (702)
Air-Launched Msls										
Hound Dog	216	460	580	580	560	540	540	540	520	520
Strategic Reconnaissance										
SR-71							25	25	25	25
RB-47	90	45	30	30	30					
RC-135						10	10	10	10	10
Total	90	45	30	30	30	10	35	35	35	35
Surface-Surface Msls										
Atlas	28	57	126	126	(99)	(99)	(68)	(68)	(68)	(68)
Titan		21	67	108	54 (108)	54 (108)	54 (108)	54	54	54
Minuteman I			160	600	800	800 (750)	700 (610)	550 (480)	400	250 (300)
Minuteman II						80 (200)	300 (390)	450 (620)	600 (800)	750 (900)
Polaris	80	96	144	224	416	448	656	656	656	656
MLF (Polaris A-3) [d/]								8 (0)	48 (0)	128 (0)
Total ICBM/Pol.	108	174	497	1058	1270 (1419)	1382 (1601)	1710 (1832)	1718 (1878)	1756 (1978)	1836 (1978)
Other										
Quail	224	392	392	392	392	390	390	390	390	390
KC-135 [e/]	400	440	500	580	620	620	620	620	620	620
KC-97	600	580	340	240	120					
Regulus	17	17	17	7						
PACCS										
KC-135			17	17	18	24	24	24	24	24
B-47		18	36	36						
Alert Force Wpns [f/]										
Weapons	836	1551	2071	2689	2601 (2801)	2535 (2798)	2715 (2896)	2722 (2938)	2732 (3015)	2775 (3015)
Megatons	1651	3382	3976	5835	5041 (5383)	4940 (5360)	5128 (5367)	5128 (5681)	5129 (5758)	5195 (5781)

Footnotes on next page

a/ The forces proposed by the Secretary of the Air Force and the Joint Chiefs of Staff less Chief of Staff Air Force, where different from the Recommended Forces, are shown in parentheses.

b/ Possible assignment to NATO of UK or other nuclear weapons, including the UK Polaris force in accordance with the terms of the Nassau Pact, have not been taken into account in the recommended U.S. force structure.

c/ Numbers of aircraft do not include command support or reserve aircraft.

d/ The Multi-Lateral Force consisting of the Polaris A-3 on surface ships is included under the assumption that formal agreements would exist by July 1965. The cost of this force is not included in the costs of the Strategic Offensive forces. The proposed force of 200 missiles in 25 ships would be achieved by mid-1971.

e/ Excludes National Emergency Airborne Command Post and Post Attack Command and Control System aircraft.

f/ The alert force weapons and megatons are based on actual data through end FY 1964 except for end FY 1961 where the actual data are based on an April 1, 1961 position. On July 15, 1961, about 50 percent of the strategic aircraft were on alert compared with about 30 percent previously. Beyond FY 1964 the extrapolations are based on most recent data. The average numbers and yields of aircraft weapons are as follows: B-47s, 1.75 weapons and B-52, 3.32 weapons and (exclusive of the Hound Dog missiles); B-58s, five weapons and . For the FY 1965 period and beyond 90 percent of the ICBMs are assumed on alert except Minuteman I for which an 85 percent alert rate was assumed during the period of missile retrofit. In addition, about 53 percent of the Polaris force is assumed to be on-station while an additional 10 percent of the force would be in-transit to patrol areas.