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December 3, 1964

THE SECRETARY OF DEFENSE
WASHINGTON

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	8.2	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. Complicating the Enemy's Defensive Problem - 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. <u>Hedging Uncertainties In the Dependability of Our Strategic Offensive Forces</u> - 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)	(%)	Ltd. Fallout Protection: Total (Millions)	(%)	Nation-Wide Fallout Program: Urban (Millions)	(%)	Nation-Wide Fallout Program: 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 Dewline 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)	1758 (1978)	1838 (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					18	24	24	24	24	24
KC-135			17	17						
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

EXCLUDED FROM AUTOMATIC REGRADING
DOD DIR 5200.10 DOES NOT APPLY

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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.

APPENDIX A

Specific Basis for Recommendations Concerning Strategic Retaliatory Forces, Continental Air and Missile Defense Forces, and Civil Defense

The following are the reasons for my specific program recommendations concerning the strategic retaliatory forces, continental air and missile defense forces, and civil defense.

A. Strategic Retaliatory Forces

1. Strategic Aircraft Forces

a. AMSA and Related Advanced Development Proposals

i. Engine Development

No specific configuration of AMSA is proposed by the Secretary of the Air Force at this time. The reason for this is that, with current engine technology, it is not now possible to design an engine to power an airplane that meets the tentative specifications set forth in the Air Force proposal. The Air Force has proposed a two-year advanced engine development program which would result in a firm engine specification in late 1966. Since engine performance is the critical factor around which AMSA would have to be designed, the configuration and performance of the airplane would not normally be defined until approximately one year after the level of engine technology is frozen.

I recommend approval of $16 million in FY 1965 and $24 million in FY 1966 for an advanced engine development program. This program will be of general benefit to future high performance aircraft as well as AMSA (e.g., new F-111 engine, SST engine, V/STOL fighter engines). These funds, in addition to other approved sources, would provide a satisfactory basis for an engine specification in two years. The Air Force, in the AMSA propulsion PCP, asked for $26 million in FY 1965 and $30 million in FY 1966 to carry out a program of essentially the same technical content as the one I am recommending.

ii. Avionics

The AMSA avionics scheduling must be consistent with the rest of the program. Since engine development is the pacing factor, no avionics engineering development program is appropriate for at least two years. First flights of avionics systems specifically for AMSA are not needed before 1970 at the earliest. The Air Force PCP for avionics proposes $11 million in FY 1965 and $14 million in FY 1966. No specific "brassboard" equipment developments have been identified for consideration beyond those already covered in our extensive approved avionics advanced development program. This approved program includes the Mark II avionics for the F-111, the ILAS system for the A7E, and the SR-71 equipments. If attractive "brassboard" proposals are offered in the next two years which are not a part of the existing advanced development programs, they will be considered on their merits. However, no special funding need be provided at this time for that purpose. Avionics system study at a level of $2 million per year is sufficient to support AMSA systems studies.

As I will discuss below, I recommend that funding provisions be made for the development of a new air-to-surface missile (SRAM) compatible with the B-52, F-111, AMSA, and other future aircraft. In order for the SRAM to be used by the B-52, an avionics development is needed to augment the present B-52 bomb-navigation system. The B-52 test bed would be used for testing more advanced components (for example, as proposed for AMSA) in an evolutionary manner. Therefore, I recommend that we initiate a B-52 SRAM avionics program. This, and the studies and developments mentioned earlier, are included in my recommended advanced avionics development program which is estimated to cost $7 million in FY 1965, $12 million in FY 1966, and $11 million in FY 1967.

iii. AMSA Project Definition Phase

The PCP for AMSA requests $15 million in FY 1965 to conduct a formal Project Definition Phase and $77 million in FY 1966 to begin development if it is later decided to do so. It is not appropriate to initiate a Project Definition Phase for the AMSA for at least two years. This phase of the development cycle requires the completion of advanced development for the engines and avionics contemplated for use in the aircraft. I recommend that $5 million in FY 1965 and $3 million in FY 1966 be provided for AMSA system studies.

b. Short-Range Attack-Missile (SRAM)

The Air Force proposed the initiation of a Project Definition Phase for the short-range attack-missile, at a cost of $4.5 million in FY 1965 and $15 million in FY 1966. Estimated RDT&E funds for FY 1966-FY 1969, to support weapon systems development were also identified. The preliminary estimates of the development program (including Project Definition) are as follows:

TOTAL OBLIGATIONAL AUTHORITY
($ in Millions)

RDT&E	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	Total Development
SRAM	5	29	39.7	23	4.5	101.2

I recommend approval of this proposal if it can be shown that SRAM does indeed add to the capabilities of our tactical aircraft and does diversify the strategic threat to the Soviet defenses and would be able to penetrate improved Soviet defenses. During the Project Definition Phase (PDP) specific operational specifications, project goals, milestones, and time and cost schedules will be established. The effectiveness of the missile in relation to its cost will again be re-analyzed. At the completion of PDP, I will be able to recommend whether or not engineering development should follow. However, I believe that funding provision should be made since the SRAM system now appears to be the best way of delivering weapons from bombers and it appears to be technically feasible. If I later have any serious question concerning the value of proceeding with engineering development, I will recommend that these funding provisions be deleted.

c. Phase-Out of the B-52 B Series

In May 1963, I approved a plan under which the B-52 B aircraft are reflexed to Guam. These aircraft replaced B-47s which had previously been reflexed, also to Guam. At that time I viewed this measure as an interim solution until the Polaris submarines could be deployed to the Pacific. The first Polaris submarine will be deployed to this area early next year. I have also reviewed the SIOP and contingency requirement for continual reflex on Guam, and while I am uncertain that the general war capability afforded by those aircraft would be significant considering their vulnerability and time-over-target, I concur with the recommendation of the Joint Chiefs of Staff that this capability be retained until end FY 1966.

In view of these considerations, and the rapid buildup in our missile force, I recommend the phase-out of the B-52 B series aircraft associated with the SAC crew training mission by the end-FY 1965, and the phase-out of the two reflex squadrons by end-FY 1966. The number of authorized wings will be reduced from 14 to 13, by end FY 1966, with a corresponding reduction of UE aircraft from 630 to 600.

Furthermore, retention of the 41 B series aircraft would require about $70 million for structural modifications. When operating costs through FY 1970 are included, systems cost total about $190 million, or about $4.6 million per aircraft, not counting possible savings from reductions in requirements for SAC base support or tanker requirements.

d. B-52 Modification Program

We are carrying on a continuous maintenance and modification program for the B-52 fleet. In FY 1965, the costs amount to about $302 million. This program includes depot maintenance, modifications for flight safety, and various improvements in the combat effectiveness of the bombers such as infra-red detectors and radar jamming devices. The currently approved modification program also includes two major structural modifications known as ECPs (Engineering Change Proposals) 1124 and 1128. These consist primarily in strengthening the aft portion of the fuselage and vertical tail structure, plus structural wing fasteners. ECP 1124 will be completed by January 1965 at a cost of about $20 million. ECP 1128 will be completed by the end of FY 1966 at a total cost of about $238 million. These modifications should remove the current flight restrictions and extend the aircraft life of the B-52 "C" through "H" series to FY 1970-1972.

The Air Force has recently indicated that $332 million will be required in FY 1966 instead of the $251 million previously approved. They have not made an official submission for increased modification costs in subsequent years, although increases will probably be required. Working with the Air Force, my staff has developed approximate estimates of these costs for the years 1966-1970. Although all of these estimates will require detailed scrutiny later, they represent our best available data now and should be used for planning purposes.

During the past year, thorough reviews have been made of the structural integrity and life expectancy of the B-52s by scientific, other governmental, contractor, and Air Force personnel. One result of these reviews was tentative identification of additional modifications that will extend the life of the B-52s at least until 1975. These modifications are known as ECP 1185. These modifications, if done to all 703 B-52s in the Air Force inventory would cost about $755 million. However, deletion of the 41 B-52B's reduces this by $70 million. Because ECP 1128 will extend the life of the B-52 "C" through "H" to FY 1970-1972, a decision to do ECP 1185 on the 371 B-52 "C" through "F" (at a cost of about $547 million, which includes an entire new wing for these aircraft) need not be made at this time.

However, I do recommend that we now make provisions for ECP 1185 for the 291 B-52 "G" and "H" series aircraft to extend their life to at least end-FY 1975. The total estimated B-52 modification costs, based on this recommendation, are summarized in the following table.

ESTIMATED B-52 MODIFICATION COSTS
(TOA in $ Millions)

	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70	Total FY 1966-70
ECP 1124/1128	146	73					73
ECP 1185(B52G/H)	-	7	32	67	32		138
Depot Maintenance	80	142	118	115	115	115	605
Flight Safety Modifications	25	25	25	25	25	25	125
Capability Improvements	51	92	73	66	50	50	331
Total	302	339	248	273	222	190	1,272

e. The SR-71 Program

Since program inception in February 1963, substantial progress has been made on the SR-71 program. The approved program consisting of six test and 25 operational vehicles is proceeding on schedule. Two of the R&D vehicles have already been delivered and the last of the six test vehicles is scheduled for delivery in March 1965. The first operational vehicle is scheduled for delivery in May 1965, and the 25 vehicle program is scheduled for completion in May 1967. As you already know, the SR-71 aircraft is capable of satisfying a broad range of requirements for pre-war and post-attack reconnaissance. Several different reconnaissance payloads and ECM options are available.

The SR-71 is a two-man aircraft having a gross weight of 140,000 pounds. Selected characteristics for alternative missions are summarized as follows:

SELECTED CHARACTERISTICS FOR ALTERNATIVE MISSIONS

Mission	Payload (lbs)	Range Between Refueling (n.mi.)	Altitude (000 ft)	Cruise Speed (Mach)
Maximum Range				
Maximum Altitude				

With two refuelings, the total range of the SR-71 varies between .mi. allowing intercontinental operations. There is every reason to believe that the performance of the SR-71 will meet or exceed its specifications.

The costs of the currently approved program are as follows:

TOTAL OBLIGATIONAL AUTHORITY
($ in Millions)

	Prior Years	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70
R&D	89.8	81.0	17.0				
Investment	112.0	282.0	367.7				
Operating	.1	4.1	21.1	91.9	94.0	94.0	94.0
Total	201.9	367.1	405.8	91.9	94.0	94.0	94.0

2. Missile Forces and Command Control and Communications

a. Phase Out of the Atlas ICBMs and the Titan I ICBMs -- The previously approved program called for the phase out of the 27 Atlas D missiles by end FY 1965; 27 Atlas E missiles by end FY 1967; and the 54 Titan I missiles by end FY 1968. The Atlas F and Titan II missiles were programmed to remain in the force through out the planning period. The JCS recommend no change in this schedule in their review earlier this year. However, last spring I tentatively proposed an earlier phase out of these first generation missiles.

The Air Force has concurred with my tentative guidance which proposed the phase out of 27 Atlas E missiles by the end of FY 1965, phase out of 72 Atlas F missiles by the end of FY 1968, and phase out of 54 Titan I missiles by the end of FY 1965. The Atlas E, configured one missile per site, is hardened only to 25 psi and has a reaction time of 15 minutes. The Titan I is configured three missiles per complex. Theoretically, it is hardened to between ... psi, but the great complexity of the system makes its survival potential very uncertain and most probably lower. Moreover, the reaction time of Titan I is also slow; the first missile launches 15 minutes after the execution order, the second missile 11 minutes later, and the third 11 minutes later -- a full 37 minutes after the order to five is given. These liquid fueled missiles are complex and costly to operate and maintain.

Furthermore, the dependability of these missiles in retaliatory circumstances has been estimated to be low. Although the Atlas F missiles (68 operational launchers) is hardened to about psi and has a reaction time of eight minutes, the dependability of this series of missiles has also fallen short of expectation. Consequently, I also propose the phase out of the Atlas F missiles by end FY 1965. The Titan II missiles, on the other hand, are fully hard, capable of silo launch, and have a reaction time comparable to Minuteman. Since large numbers of Polaris, Minuteman and Titan II are in inventory, it seems appropriate to phase out these complex first generation missiles in order to realize cost savings that can be applied to more effective systems.

Accordingly, I recommend:

(a) Phase out of Atlas E by end FY 1965.

(b) Phase out of Atlas F by end FY 1965.

(c) Phase out of Titan I by end FY 1965.

(d) Retention of Titan II through the current planning period.

The Joint Chiefs of Staff concur in these recommendations, except that they propose that Atlas F be phased out during FY 1966.

The costs associated with the previously approved and my recommended program are summarized as follows:

	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
Previously Approved						
TOA (In Millions)						
Atlas	$ 133.8	$ 101.6	$ 79.1	$ 72.[illegible]	$ 72.3	$ 72.[illegible]
Titan	141.8	123.4	111.3	96.[illegible]	79.6	[illegible]
Total	$ 275.6	$ 225.0	$ 190.4	$ 168.[illegible]	$ 151.[illegible]	$ [illegible]
Number of Missiles (End Fiscal Year)	207	207	180	126	126	126
Recommended[a/]						
TOA (In Millions)						
Atlas	$ 97.7	$ 0	$ 0	$ 0	$ 0	$ 0
Titan	127.2	73.8	53.8	49.[illegible]	47.6	[illegible]
Total	$ 224.9	$ 73.8	$ 53.8	$ 49.[illegible]	$ 47.6	$ [illegible]
Number of Missiles (End Fiscal Year)	54	54	54	54	54	54

b. The Minuteman Program -- The previously approved Minuteman program [illegible] Minuteman II missiles by end FY 1966. [illegible] consisted of 750 Minuteman I and 20 Minuteman II planning purposes, the force consisted of 400 Minuteman I and 800 Minuteman II by end FY 1969. The Joint Chiefs of Staff, [illegible] the Chief of Staff, Air Force, recommended no change in this schedule during their review early this year. F[illegible] end FY 1970 their proposed force level would consist of 300 Minuteman I and 9[illegible] Minuteman II. At that time the Chief of Staff, Air Force, recommended an addi-tional 150 operational Minuteman II by the end FY 1968, for a force level of 1,250 missiles compared with 1,100 missiles as previously approved. For planning purposes the Air Force proposed a 1,500-force level in FY 1970, consisting of 300 Minuteman I and 1,200 Minuteman II.

During my review last spring of the Joint Chiefs of Staff recommendations I tentatively proposed to level-off the Minuteman force at 1000 missiles. Sub-sequently, in response to my guidance, the Secretary of Air Force submitted a program for 1000 Minuteman. However, both Secretary Zuckert and the Joint Chiefs of Staff have stated that they support a force of 1200 Minuteman rather than the currently recommended force of 1000 Minuteman.

a/ All Fiscal 1965 and 1966 costs used in this section are subject to final determination during budget review.

Several alternative programs were re-evaluated during my current review of the Minuteman program. The TOA (in millions) associated with these alternative programs is as follows:

	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970	Total FY 65-70
Prev. App'd. (1200 Minuteman)	1540.3	1143.2	1033.3	525.2	253.2	280.0	[illegible]
CSAF/JSOP Proposed (1500 Minuteman)	1540.3	1532.2	1840.3	975.2	337.2	334.0	[illegible]
SecAF Plan (1000 Minuteman)	1458.0	1116.5	763.2	659.6	564.8	495.1	[illegible]
Recommended (1000 Minuteman)	1345.7	932.1	807.7	656.0	614.3	594.0	3604.1

The force levels associated with these alternative Minuteman programs are as follows:

	End Fiscal Year					
	1965	1966	1967	1968	1969	1970
Previously Approved						
Minuteman I	800	750	610	480	400	400
Minuteman II		200	390	620	800	800
Total	800	950	1000	1100	1200	1200
CSAF/JSOP Proposed						
Minuteman I	800	750	610	480	400	300
Minuteman II		200	390	770	1100	1200
Total	800	950	1000	1250	1500	1500
SecAF 1000 Minuteman Plan						
Minuteman I	800	770	650	500	350	[illegible]
Minuteman II		110	350	500	650	[illegible]
Total	800	[illegible]	1000	1000	1000	[illegible]
Recommended						
Minuteman I	800	[illegible]	700	550	400	250
Minuteman II		[illegible]	300	450	600	750
Total	800	[illegible]	1000	1000	1000	1000

Compared with Secretary Zuckert's plan, my recommended program incorporates a six-month slip in force modernization rather than a two-month slip as proposed. My reasons for the delay will be discussed below.

The deployment of the Minuteman II force under my recommended program is as follows:

Minuteman II Force Deployment	End Fiscal Year				
	1966	1967	1968	1969	1970
Wing VI	80	150	150	150	150
Co-Located Missiles		50	50	50	50
Retrofitted Minuteman I Silos		100	250	400	550

The twentieth squadron (beyond the squadrons in Wing VI) will be co-located with Wing I at Malmstrom Air Force Base. The continuation of retrofitting beyond FY 1968 will be required to increase our assurance in force flexibility and to replace missiles exceeding their safe-life.

Specific issues involved in this year's evaluation were as follows:

a. Minuteman Force Level. For reasons already discussed, I have concluded that a force level of 1,000 Minuteman is adequate throughout the current planning period. While the starting acquisition of Wing VI is proceeding a previously planned, the Air Force's plan incorporates a six-month stretchout in the acquisition of Wing VI. The stretch allows a more economical lower risk program by smoothing the early build-up rate. I concur in this proposal.

b. Force Modernization. The retrofit of Minuteman I silos for full compatibility with Minuteman II will commence in mid-1966. As I will show below, the Minuteman II with the recommended improvements will provide us with a very flexible missile system capable of destroying fully hard targets and having high assurance in penetrating defended areas. Minuteman II with the improvements I have previously recommended would increase target destruction capabilities by about 50 percent compared to a Minuteman I force of the same size. However, the addition of the improvements I now propose would increase these capabilities two-fold. Two issues have been raised during the current review. The first is concerned with the initiation of the retrofit program; and the second, with the implementation of the reprogramming capability.

Secretary of the Air Force proposed a two-month slip in the start of the retrofit program since there has been some slip in the milestones associated with this program. During my review I considered, in addition to the two-month slip, a six-months' and a year's slip. I recommend that the program be initiated in July 1966 rather than January 1966 as previously approved. The six-month slip results in a program that has a lesser degree c concurrency when compared with the two month slip. By April 1966 all important milestones including an R&D flight test program associated with the retrofit configuration are scheduled for completion. A choice between a modernization program having the 12 month rather than the six month slip depends on judgments concerning the early availability of the improved force capability. A 12 month slip would result in about a $100 million savings through FY 1967. However, additional costs, of about $140 million would be required in FY 1970-1971. While some of the flexibility modifications are in the development stage and remain to be tested, the technical risks are small and should not preclude their operational availability as required in my recommended program.

The Secretary of the Air Force proposed a retrofit program on a wing-at-a-time rather than the squadron-at-a-time basis. Their proposal somewhat simplifies installation, equipment and spares support. However, it is not clear that reprogramming can be achieved without internetting. I tentatively propose to achieve force flexibility and reprogramming through the squadron internetting of Minuteman I and II (including the co-location and internetting of the twentieth squadron with Wing I).

c. Reliability Test Program. Last year I recommended approval of an extensive operational and follow-on reliability test (FOT) program. In addition to the allocation of 50 Minuteman II to the operational test program, about 10 percent of the Minuteman II were allocated to the follow-on test program. In the Spring of this year the percentage allocated to the follow-on program was reduced to about eight percent. Should studies by either the JCS, the Services, or my staff indicate that a change in the extent of this program is desirable, I would forward recommendations at that time.

The Air Force in their submission have proposed the procurement of additional Minuteman I missiles for the FOT program in view of the slip in the modernization program, and the procurement of additional Minuteman II missiles to test further improvements in guidance and re-entry vehicle subsystems (as discussed below). With the recommended program 16 months will lapse between the end of the operational test program for Minuteman I and the availability of missiles resulting from the initiation of the force modernization program. During this period assets consisting of about 25 Minuteman I missiles could be used for FOT purposes. In addition, the Air Force proposed to keep the Minuteman I production line open and procure a minimum of 18 missiles in the FY 1965 budget. To test improvements in Minuteman II guidance and re-entry subsystems, the Air Force proposed procurement of an additional 15 Minuteman II missiles in FY 1965 and 1966. For later years a minimum of 28 special test launches were identified.

I do not recommend additional procurement of Minuteman I or special improvement test of Minuteman II missiles. The Minuteman I FOT program is currently scheduled to immediately follow the operational test (OT) program. Since a primary purpose of the FOT program is to detect degradation trends in missile reliability, I believe that a reasonable length of time should pass before commencing with the FOT program. For example, the OT program for Polaris A-2 was completed in October 1963, this month the first four FOT missiles were fired and all were successful. Therefore, I believe that the 25 Minuteman I missiles are more than adequate, provided that six months pass before initiating the FOT program. As with the Minuteman I program, six to nine months should lapse before the Minuteman II FOT is initiated. For planning purposes, my recommended program includes the following number of missiles in each fiscal year for this purpose. These will be provided with missile procurement funds. Except Minuteman I missiles are also available.

	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
Annual Special Test Launches	5	12	13	15	15

d. N-17 Guidance Improvements. The Air Force has proposed changes to the current N-17 guidance and control system which reduce the errors associated with the subsystem from about . . to . Total R&D and investment costs associated with this proposal are about $35.0 million exclusive of a flight test program. As I have indicated above, eight of the already procured Minuteman II missiles can be used to support the flight program. With improved re-entry vehicles, to be discussed below, the over-all CEP of Minuteman II would be reduced to around With programmed yields the probability of destroying targets hardened up to 300 psi would be in excess of 90 percent. I recommend approval of this program. The flight test program will be supported within the special test missile allocation.

e. Mark 17 Re-Entry Vehicle. The Air Force has proposed a new re-entry vehicle having a high lift/drag ratio and a yield of approximately This re-entry vehicle when employed with the improved guidance system would result in CEP's of about feet, as compared with the Mark IIA system currently in production, which, with improved guidance, would have a CEP of around feet.

The RDT&E cost associated with the development program is estimated to be $89 million, exclusive of flight test missiles, including systems integration and the test of the system. The procurement costs are estimated to be comparable to the cost of the Mark IIA; a part of the Mark IIA program would be superseded by the Mark 17 program.

I recommend approval of this program. However, the flight test program will be supported within the special test missile allocation discussed above.

f. MK 12/MIRV. The previously approved RDT&E program includes funds for the MK 12/penetration aid effort. I intend to change the direction of this effort to provide for the development of a capability for delivering three MK 12 warheads to geographically separated targets in addition to the capability for the precise ejection of penetration aids. A portion (to be determined) of the $31.1 million in FY 1965 will be used to support this effort. In addition $51.9 million is provided in FY 1966. The flight test of the systems associated with this program will be supported within the special test missile allocation discussed above.

g. Operational Base Launches. The Air Force has proposed a program of operational test launches from operational silos to demonstrate missile/launcher compatibility. Their proposal calls for the launch of three modified missiles with inert second and third stages. The time of powered flight is seven seconds.

This proposal supersedes the isolated squadron proposal submitted last year by the Air Force which would have also provided for actual test of the system. I believe that the operational base launch program now proposed when coupled with the continued firings from Vandenberg Air Force Base will permit the realism necessary to assure continued confidence in the reliability factors. I recommend that the program be approved, at a cost of $[illegible] million.

In addition, I recommend approval of the following programs included in the Air Force proposal:

a. [illegible] personnel proficiency trainers. Total cost $4.[illegible] million.

b. Hardness for nuclear effects testing of Minuteman facilities, if test ban treaty abrogated. Total cost $[illegible] million.

c. 465L and UHF radio subsystems for Wing VI and 20th squadron. Total cost $[illegible] million.

d. [illegible] of Minuteman [illegible]. Total cost $1.2 million.

e. Development of high altitude [illegible] capability. Total R&D cost $[illegible] million.

f. Development of a trajectory accuracy prediction system (TAPS) which transmits data back to a control center that a Minuteman missile had achieved a successful powered flight. Total R&D cost $8.6 million.

g. Engineering effort only on the proposed remote secure data subsystem commencing in FY 1966 at a total cost of $9 million.

h. Continuation of the [illegible] support of [illegible] in the Minuteman program in FY [illegible] at a cost of $10.[illegible] million.

i. Consolidation of resources for Minuteman I and II Communication Support-[illegible] into the single [illegible] program element 1.10.15.91.01 as proposed by the Air Force.

Finally, the Air Force has also proposed several other additions to the Minuteman program whose approval I do not recommend at this time. They are:

a. [illegible] insertion of [illegible] data into the [illegible] computer for the entire Minuteman force at a cost of $147 million. However, engineering effort will be undertaken at a total cost of $9 million.

b. Procurement of additional missiles beyond FY 1966 for weapon system improvement launches, at a cost of $141 million.

The following are the funds necessary to support the program that I am recommending.

i. Minuteman RDT&E Cost

These costs are as follows.

	RDT&E TOA (In Millions[illegible]						
	FY 1964	FY 1965	FY 1966	FY 1967	FY 196[illegible]	FY 1969	FY 197[illegible]
Minuteman I	88.8	16.5					
Minuteman II	329.3	307.1	238.0	161.2	67.[illegible]	15.0	

ii. Minuteman Investment Costs

Minuteman I: The following table summarizes Minuteman I investment costs.

	Investment TOA (In Millions[illegible]						
Minuteman I	FY 1964	FY 1965	FY 1966	FY 1967	FY 196[illegible]	FY 1969	FY 197[illegible]
Msls Proc	1191.2	55.6	28.5	25.2	18.[illegible]	9.5	3.6
Aircraft Proc	5.1	6.5	11.2	.9	.[illegible]	.9	
Other Proc	3.2	4.9		.7	.[illegible]	.4	
Mil Const		.7				.1	
Total	1199.4	67.7	39.7	26.8	19.[illegible]	10.9	3.6

Minuteman II: To support the recommended Minuteman II program the following missile procurement schedule is required.

Missile Proc	FY 1964	FY 1965	FY 1966	FY 1967	FY 196[illegible]	FY 1969	FY 1970
Previously App'd	30	293	249	301	176	80	
Recommended	30	232	178	197	207	220	232

The funds necessary to support the recommended program are as follows:

Minuteman II							
Missile Procurement							
Missiles	101.9	440.8	293.7	325.6	336.0	353.6	371.2
AGE	97.7	137.3	62.0				
Training	11.4	14.4	0.9	2.4			
Tech Data	7.4	15.3	12.0	3.3			
Site Act	48.9	58.3	24.1	10.0			
Mods	0	71.3	156.8	170.5	126.5	137.0	124.0
Spares	0	40.0	15.0	21.8	19.1	9.6	7.4
Ind Facil	4.8	1.0	1.5				
Sub Total	272.1	778.4	566.0	533.6	481.[illegible]	500.2	50[illegible]
Other Investment							
Aircraft Proc	1.3	8.0	2.8	.2	.2	.2	[illegible]
Other Proc	21.8	14.1		1.5	1.5	1.7	1.7
Mil Const	156.1	102.7	10.0				
Sul Total	179.2	124.8	12.8	1.7	1.7	1.9	1.9
Total	451.3	903.2	578.8	535.3	483.3	502.1	504.5

A comparison with the previously approved and Air Force proposed investment costs for Minuteman II is as follows:

	TOA (In Millions)					
	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
Previously Approved	1042.6	884.5	919.3	410.8	151.4	NA
Air Force Plan	1000.2	776.5	580.3	527.7	450.1	387.2
Recommended	903.2	578.8	535.3	483.3	502.1	504.5

iii. Minuteman Operations. The operating costs, including maintenance and military personnel, associated with Minuteman recommended program is as follows:

	Operating TOA (In Millions)						
	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
Minuteman I	34.2	49.7	64.1	60.2	51.7	39.2	22.9
Minuteman II		1.5	11.5	24.2	34.0	47.1	63.0

* * * * * * * * * * * * *

In summary, the cost of the program that I am now proposing is as follows:

	TOA (In Millions)						
	FY 1964	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
Minuteman I	1322.4	133.9	103.8	87.0	71.5	50.1	26.5
Minuteman II	780.6	1211.8	828.3	720.7	584.5	564.2	567.5
Total	2113.0	1345.7	932.1	807.7	656.0	614.3	594.0

3. The Polaris Program -- The first submarine carrying the advanced model of Polaris--the 2500 n.mi. A-3--was deployed in October. All new submarines to follow will deploy with this missile. The earlier 1200 n.mi. A-1 commenced its phase-out in June with GEORGE WASHINGTON returned for overhaul after four years of operation.

The start of FY 1966 will find 25 Polaris submarines deployed--of these one will be carrying the A-1 missile, 13 the A-2 missile, and 11 the A-3. Four of the A-3 submarines will be in the Pacific--the remainder in the Atlantic and Mediterranean.

We will conduct a series of 50 operational test firings of the Polaris A-3 between April and December 1965 to establish weapon system readiness, reliability and accuracy factors for SIOP planning. These tests were completed on the A-2 missile in October 1963 with an observed success ratio of 79% in a total of 24 missiles fired. Early indications from the A-3 development and shakedown operations (DASO) are that this missile will have an even higher reliability. Of the 15 A-3 missiles fired in DASO to date, 14 have been completely successful.

The Navy had previously proposed that all Polaris A-1 and A-2 missiles be retrofitted with the A-3 missile. The A-3 missile has a longer range (2,500 n.mi.) than the A-1 (1,200 n.mi.) or A-2 (1,500 n.mi.) and carries a three element warhead. The A-1 retrofit program is proceeding according to the Navy's proposal. Last year the decision was made not to implement the retrofit of the A-2 missiles with A-3's at least through 1970. The Joint Chiefs of Staff and I concur that the Polaris force level and mix of missiles should remain unchanged.

Even though the range of the A-3 is greater than the A-2, a large fraction of the Soviet Bloc targets are within range of the Polaris A-2 missile. During 1971 the Polaris force will be commencing the second overhaul cycle. At that time, if conditions warrant it, retrofit will be considered, possibly employing the B-3 missile. The last of the re-supply ships supporting the Polaris force will be programmed in FY 1966.

RDT&E emphasis has shifted from the initial development and deployment of the FBM force to the continuing work necessary to maintain and improve the current high degree of dependability in spite of any likely countermeasures that an adversary might take against it. We have identified three areas to receive special emphasis. These are survivable command communications, reduced vulnerability to nuclear radiation effects on missile guidance and control systems, and improved capability to penetrate any ballistic missile defenses that the Soviets might deploy.

As an eventual replacement for aging Polaris A-2 missiles, and as a hedge against extensive ABM deployment by the Soviets, we are considering initiating the development of Polaris B-3. This missile would carry the largest payload that can be provided within the existing submarine launch tubes. Total payload weight and space would be fully twice that of Polaris A-3 at the same range. The new missile would incorporate improved accuracy and payload flexibility which would permit each missile the flexibility 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 both with regard to ultimate shelf life of the older missiles and the likely schedule of Soviet ABM deployment, the best schedule and pace of development for a B-3 is not clear. We intend to conduct a Project Definition for the B-3 during FY 1965 and to commence some development activity in FY 1966. I recommend that $35 million be budgeted for this purpose in FY 1966. This would allow us to have an initial operational capability any time from 1971 on, depending upon the pace of development to be followed.

The costs associated with the recommended and previously approved Polaris program are as follows:

	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
			TOA (In Millions)			
Previously Approved	1064.4	935.0	737.6	737.4	713.4	NA
Recommended	1064.4	95[illegible].2	737.6	7[illegible]7.[illegible]	713.[illegible]	71[illegible]

4. Regulus -- Earlier this year, I had approved the early removal from the SIOP commitment of the Regulus submarines as proposed by the Joint Chiefs of Staff.

5. Command, Control, and Communications for the Strategic Forces -- The following summarizes my recommendations relating to our efforts to insure that in the event of nuclear war our commanders retain flexible command and control over the strategic force.

i. Strategic Air Command Control Systems. This program includes:

(1) Strategic Air Command Control System (465L), a semi-automatic command and control system for war planning and control of the SAC force.
(2) SAC primary alert system.
(3) Ground/Air (short order) Stations.
(4) SAC High Frequency Single Side Band Radio System Stations.
(5) SAC teletype network.
(6) SAC telephone network.

Adjustments are required in the presently [illegible] program to reflect current estimates of manpower requirements and operating costs, and to provide for evolutionary improvements through FY 19[illegible]. Funds are provided to achieve an operational capability [illegible] the end of FY 19[illegible]. Annual costs are as follows:

	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
			TOA (In Millions)			
Previously Approved	76.3	57.6	56.0	55.9	[illegible].9	-
Recommended	72.6	57.9	52.3	51.0	47.2	46.9

ii. PACCS. This is a system which provides SAC with the essential capability to exercise effective and flexible command, control and direction of strategic operations following a sustained high order thermonuclear [illegible]. I concur with the Air Force proposal to substitute 10 KC 135A aircraft [illegible] 36 EB-47L's. It would significantly reduce O&M and personal expenditures while providing more effective and flexible capabilities. I have asked the Air Force to submit proposals for an Airborne Launch Control Center (ALC[illegible]) for the Minuteman forces. PACCS FY 196[illegible] research and development funds [illegible] already been released to initiate this capability. I recommend approval of the program with costs as follows:

	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
			TOA (In Millions)			
Previously Approved	40.8	51.6	41.7	38.7	34.7	-
Recommended	41.4	35.8	19.1	18.9	18.9	18.9

The EB-47's will be phased out by end FY 196[illegible].

iii. UHF Emergency Rocket Communications System (ERCS). This system is intended to provide a reliable, survivable emergency means of communications between the Commander-in-Chief of the Strategic Air Command and SAC forces. The system is to be deployed during and after a nuclear attack on the United States to broadcast to surface and airborne SAC forces information required to initiate and execute the emergency war order. The Air Force proposed retention of the presently approved program. I recommend approval of the program shown below. This will provide O&M funding at a realistic level and assure that the interim operational ERCS devices (Blue Scout boosters) are effective pending replacement by the 494-L follow-on system using Minuteman boosters.

	TOA (In Millions)					
	FY 1965	FY 1966	FY 1967	FY 1968	FY 1969	FY 1970
Previously Approved	27.9	1.1	0.7	0.4	0.4	-
Recommended	29.1	2.4	2.2	.9	.9	.9

B. Continental Air and Missile Defense Force Structure Changes

1. Air Defense Weapons.

a. Phase down of Current Interceptors. In recent years the bulk of our effort in the area of Continental Air and Missile Defense Forces has been directed toward protecting ourselves against bomber attack. We have maintained a large force of both manned interceptors and surface-to-air missiles to counter this threat. However, as ballistic missiles constitute, to an ever increasing degree, a major threat to the U. S., it is necessary to reconsider the size and mix of our defenses. I believe that the primary purpose of our interceptor force is to reduce damage to the United States in the event of an attack on this country. At present, with no defense against ballistic missiles and only the beginning of a viable civil defense posture, our anti-bomber defenses could operate on only a fraction of the damage inflicting forces in a determined Soviet attack. A balanced defense, thus, calls for a reorientation of our efforts -- both within anti-bomber defenses and between anti-bomber and anti-missile defenses. Any judgment as to the required size of our interceptor force should depend on analysis of the degree to which alternative forces can limit damage to our nation.

In the past several months my staff and that of the Joint Chiefs of Staff have conducted a quantitative effectiveness comparison of the currently approved interceptor force and a proposed smaller force which will be described shortly. These studies indicate that, regardless of the size of our interceptor force, unprecedented damage could be inflicted on the United States by a determined Soviet attack of bombers and missiles. Indications are that 90-120 million fatalities could be expected from such an attack if we retained our currently approved interceptor force. Adopting the smaller force would increase fatalities by perhaps 1 to 6 million persons; the Chief of Staff of the Army believes the difference would be less than 1.5 million in the most plausible situations, and I agree with his judgment. It is not clear that our analytical and computational techniques can even identify with confidence differences of this size. Thus, it no longer appears to be necessary or useful to retain our large interceptor force at its present size. Rather, it seems to me to be far more in the interests of the United States to devote our resources to programs in the strategic defensive area that offer the hope of more substantial reduction in U. S. fatalities in the event of a major nuclear war.

Therefore, I am proposing a smaller interceptor force incorporating the following changes:

(1) Phase out the 225 F-89's in the Air National Guard and transfer nine of 15 active Air Force F-101 squadrons (four in FY 1966 and five in FY 1967) to the Air National Guard to replace the F-89's.

(2) Phase out one active Air Force F-102 squadron in FY 1965, four in FY 1968, and four in FY 1969.

(3) Reduce authorized unit equipment of the 13 F-102 Guard squadrons from 25 to 18 aircraft per squadron during FY 1965.

(4) Increase the degree of dispersal (and hence survival potential under missile attack), and improve the geographical balance through redistribution of F-104 and F 106 squadrons.

By end FY 1969 this force would be smaller by 225 F-89s and 270 F-102s. At that time the smaller forces would include 732 aircraft rather than the 1,255 aircraft formerly approved for that time.

The resultant force retains a war fighting capability nearly the equivalent of the currently approved force, eventually will save us on the order of $100 million a year, provides the necessary peacetime surveillance capability, and maintains an organizational base for possible future deployment of an advanced interceptor.

b. Deployment of an Advanced Interceptor. The Air Force earlier this year proposed the deployment of a force of 216 F-12As. A decision on this program was deferred pending a decision on the other components of a balanced defense, completion of a study on the specific configuration of the F-12A, and an evaluation of the F-12As and TFX for several budget levels against several bomber attacks on the United States.

The comprehensive studies this summer on the characteristics of a balanced damage limiting program confirmed my earlier conclusion that major improvements to the air defense forces would have little value without deployment of a ballistic missile defense system and a full fallout shelter program. Moreover, when a new interceptor is required, a suitable version of the F-111 would have advantages over the F-12A. Further, it has not been shown that the first major change in the air defense forces should not be the improvement of the terminal bomber defenses in urban areas also defended by Nike-X instead of improved area defenses. For these reasons, given my decision not to start production of Nike-X at this time, I recommend that we do not now start production of the F-12A either.

The Air Force study of alternative configurations of the F-12A concluded that an interceptor version of the SR-71 airframe would be optimal. This interceptor would be equipped with the ASG-18 fire control system and AIM-47A missiles modified to incorporate some of the advanced components of the Phoenix system under development for the Navy version of the TFX. It is not necessary to develop an interceptor version of the larger airframe unless we decide to proceed to procure it.

A more recent proposal by the Air Force requested funds to produce and test 16 F-12As, deferring a decision on the ultimate force size. The Air Force requested authority to reprogram $17.8 million and $15.4 million in FY 1965 for final development and pre-production engineering, respectively. Production and test of the 16 F-12As would cost $185 million in FY 1966 and $300 million in later years to begin production at the end of the SR-71 production in July 1967. I recommend provision of $5 million in FY 1966 for final development but against reprogramming for pre-production and against any new funds for production. The technical content of the $5 million is to be established in the budget review.

The Air Force study of the F-12A and the TFX (both equipped with a modified ASG-18/AIM-47A) concluded that the TFX would be slightly superior for small budget levels against both small or large attacks by subsonic bombers; the F-12A would be superior for large budget levels against large attacks by subsonic bombers. This study also concludes that the F-12A would be significantly superior to the TFX, for a wide range of budget levels, against an attack by bombers carrying long-range air-to-surface missiles or by advanced high-speed bombers (similar to the AMSA). An independent study concludes that the TFX or, possibly, a stretched TFX would be superior against a dispersed attack by advanced bombers with a sufficient range to penetrate U.S. airspace from all azimuths. These studies indicate that the F-12A and TFX would be roughly competitive against a range of bomber threats, and each interceptor would provide insurance against different bomber characteristics and attack patterns. Of course, we retain the option of future deployment of either or both of these interceptors.

c. Development of Improved Surface-to-Air Missile Systems. The existing Hercules defenses augmented by improved Hawks would probably be adequate against the current generation of Soviet bombers. An advanced surface-to-air missile system would probably be required for defense against an advanced Soviet bomber system or against advanced air-to-surface attack missiles.

The Army proposed two development programs to provide improved surface-to-air missile systems for both continental and theater air defense. The Hawk Improvement Program would increase the capability of this system against high-speed, low-altitude targets, multiple targets within the same radar beam, and advanced ECM. I recommend that development of the improved Hawk be approved with FY 1966 funding of $9.5 million and total funding of $19 million. The Army also proposed the engineering development of an advanced surface-to-air missile system, to provide a capability against multiple high-speed aircraft and medium-range missiles, at an FY 1966 cost of $52 million. Our technical evaluation indicated that the proposed system characteristics were too advanced for the missions considered and the technology available. I recommend, consequently, that this system remain in advanced development at a FY 1966 funding of $15 million.

2. Air Defense Control and Surveillance

a. Control Systems. The Air Force proposed to deploy a new Primary Automatic Ground Environment, completely replacing the approved SAGE/BUIC system by end of 1969. The PAGE system would include 29 sector control centers and four regional control centers. The approved SAGE/BUIC system would contain four regional control centers, 12 SAGE direction centers and 34 BUIC II centers at end FY 1966.

While the PACE proposal offers some decrease in ground environment vulnerability, by providing control centers at selected BUIC sites, it also proposes complete conversion of SAGE equipment into PAGE. Under the present program, destruction of a SAGE direction center would eliminate all sector-wide control and subsequent destruction of one BUIC II in the same sector would eliminate all control over one part of the sector.

It is not clear that the proposed PAGE system with its decreased vulnerability can be justified in view of the considerable investment required. An alternative plan has evolved from discussions with the Air Force which will provide a considerably improved posture over SAGE/BUIC II for a much lower investment than PAGE. This alternative, which is called SAGE/BUIC III (described below), would utilize equipment from the current BUIC II contract and retain 12 of the SAGE Direction Centers. The first 14 BUIC II installations will be employed on an interim status until the first ten BUIC III control centers are incorporated into the ground environment system. The ultimate posture would contain 12 SAGE Direction Centers and 19 BUIC III Control Centers.

The BUIC III centers would be capable of handling 10 prime radar inputs (double the BUIC II and the equivalent of PAGE) and contain improvements to operate in a back-up control mode. Additional consoles will be required at BUIC III centers for handling the increased traffic, the back-up control mode and for Army defense weapon assignments if Army weapons exist in the BUIC III sector.

I recommend $27.8 million incremental investment in FY 1966 for the SAGE/BUIC III system. The total investment is expected to be $38 million.

b. <u>Airborne Warning and Control System</u>. The Air Force proposed the development of an Airborne Warning and Control System for a flexible backup for land-based control systems and to extend the radar coverage beyond the range of ground radars for employment both for continental and tactical air defense. The proposed R&D program would cost $121 million, including the approved FY 1965 funding of $9 million. I have supported this system concept in the past and recognize that a system with the general characteristics proposed by the Air Force would be requisite to exploit the effectiveness of a long-range interceptor. The state of technology, however, is not sufficiently advanced to initiate a full-scale system development at this time. I recommend, consequently, that the FY 1965-FY 1970 budgets include $43 million for component development in Overland Radar Technology and $12 million for the exploratory development of AWACS. I have asked the Air Force to expedite these efforts so that an early decision on full-scale system development can be made.

c. <u>Dewline Extension</u>. At present our strategic forces are geared to react upon very short warning of enemy attack. Alert aircraft would be flushed upon notification from BMEWS of an approaching attack of enemy ICBMs--with warning coming between seven and 20 minutes before impact. Meanwhile, we have been maintaining considerable far-flung surveillance activities to provide warning of enemy bomber attack thousands of miles and many hours from their targets in this country. These include the Dewline and its airborne extensions from the Aleutians to Midway and from Greenland to the United Kingdom. The Dewline extension aircraft are almost exclusively for warning rather than for assisting our defensive forces in combat. To a large extent, they are redundant, since land-based radars provide good coverage of the Greenland-U.K. airspace, though less good coverage from the Aleutians to Midway. In any case, land-based radars in CONUS would provide more warning time of bomber attack than BMEWS does of missile attack. Since a determined Soviet attack would most probably begin with ICBMs and our forces are geared to react to the short warning time of such an attack, it is not necessary to have this emphasis on the detection of bombers several hours from their targets.

I, therefore, recommend that the airborne Devline extension be phased out beginning in FY 1965 as proposed by the Navy.

d. Picket Ships and Airborne Early Warning Aircraft. The warning capability of the picket ships and Airborne Early Warning aircraft is also in excess of the reaction time of our strategic forces.

I, therefore, recommend that the picket ship force be phased down starting in FY 1965 as proposed by the Navy.

e. Reorientation of the Air Defense Surveillance System. The Air Force proposed a reduction of 16 search radars, 32 height finder radars, and nine gap filler radars over the period FY 1965-FY 1967. These reductions were identified by a recent study by the Air Defense Command and one based on revised surveillance criteria. This proposal also provides for the procurement of a new common radar data and beacon processor which is required to meet DOD obligations to the FAA for updating of the radar beacon system for air traffic control. The radar reduction will save around $111 million and the initial cost of the new common radar data processors will be around $22 million. I recommend approval of these changes. Current ADC studies are expected to identify further early reductions of height finder and gap filler radars.

3. Missile and Space Defense Weapons.

a. Nike-X Ballistic Missile Defense. Completion of the Nike-X development by end FY 1970 is now estimated to cost about $1,370 million, of which about $390 million (including $10 million for military construction) will be required in FY 1966. The Chief of Staff of the Army recommended, in JSOP-69, the deployment of 17 Nike X batteries and 3,400 missiles by end FY 1973. The total procurement cost of this force would be about $11 billion, of which about $201 million would be required in FY 1966. A decision on this system was deferred, pending completion of the major studies conducted this summer. The Army was then asked to prepare information on a program to deploy a Nike-X defense of 23 urban areas; this program was to be structured in a "building-block approach, so that deployment could be terminated at some intermediate stage and at the same time a balanced capability be retained.

The Army developed three basic systems configurations which differ primarily in combination of Multifunction Array Radars and Missile Site Radars. The HI-MAR configuration includes one MAR and about two single-face MSRs for each urban area defended; this configuration provides the most effective defense per urban area against a large, technologically sophisticated attack, but is the most costly for a given number of areas defended. The LO-MAR configuration includes, on the average, one MAR for every three urban areas and one double-face MSR and two single-face MSR for every urban area defended; for a given level of expenditures, the recent Army studies indicate that the LO-MAR configuration (1) would probably maximize survivors against a large sophisticated attack, and (2) would be clearly superior to a HI-MAR configuration against a smaller or less sophisticated attack. The NO-MAR configuration includes only MSR radars and in the same combination as the LO-MAR configuration.

The compositions, schedules, and total costs of these three alternatives (prepared by the Army) are presented in the table on the following page. It is interesting that, for a given number of urban areas defended, the total cost of the LO-MAR configuration is around 80 percent higher than the NO-MAR configuration, and the cost of the HI-MAR configuration is, in turn, around 80 percent higher than the LO-MAR configuration. It should also be noticed that the FY 1966 funding required for initial deployment in FY 1970 is approximately the same for all configurations and that the FY 1967 and FY 1968 funding is dependent on the configuration but only slightly dependent on the scale of the deployment objective.

At the present time, the primary issue on the Nike-X program is whether to provide FY 1966 production funds to permit initial deployment in FY 1970. Given a production decision in January 1965 and a production contract in October 1965, the Army estimated that FY 1966 funding of $207 million would be required to deploy the first MSR/SPRINT defense in September 1969 and the first MAR in March 1970.1/

A slippage of six months on the deployment of both the MSR/SPRINT defense and the first MAR would reduce the required FY 1966 funding to $127 million.

Subsequent to the estimates shown in the Army table, a further investigation showed that if the first MAR followed the first MSR/SPRINT defense by one year instead of six months (without changing the initial deployment date of MSR/SPRINT in September 1969), then the procurement funds required in FY 1966 would be $173 million. Slippage of the initial deployment date by six months (to March 1970), with the first MAR following one year later, would allow a further reduction of procurement funds required to $62 million. Slippage of the MAR alone would relieve a very tight engineering schedule, without affecting our ability to meet an initial deployment date or to choose an ultimate deployment option. It is consequently recommended that the MAR development be slowed down relative to the MSR/SPRINT development. It has been determined that this slow-down reduces the FY 66 RDT&E (and military construction) funds required from the $429 million to $390 million.

Next October, when the first production funds could be released, the following Nike-X development milestones will be achieved:

(1) The MAR I will be installed, tested, and evaluated.

(2) The MAR II system design will be essentially complete.

1/ Includes $5.4 million of operating cost.

Nike-X Deployment Alternatives

Sub-Systems	HI-MAR			LO-MAR				NO-MAR					
Phases	I	II	III	I	II	III	IV	I	II	III	IV	V	VI
Urban Areas	13	23	30	11	20	35	47	11	22	36	50	74	102
MAR	13	23	30	3	8	12	16						
LDP				12	25	41	54	12	28	46	65	94	122
MSR (Single Face)	24	43	69	23	48	72	91	23	47	69	92	96	100
(Double Face)				12	27	43	56	12	28	46	65	94	122
SPRINT	3984	9000	20000	2040	4896	7760	10536	1704	3408	4888	6008	7432	8776
ZEUS	400	500	0	288	544	800	1052						
TTR	40	50	0										
MTR	80	100	0										
Initial Operational Capability by CY Quarter	3/69	1/72	4/73	3/69	1/71	1/72	1/73	3/69	1/71	1/72	1/73	1/74	1/75
Total Development & Procurement Costs (In Billions)	10.9	17.7	25.4	6.8	11.7	16.0	19.8	4.5	6.9	9.0	10.9	12.8	14.6

Estimated Total System Costs of Nike-X Deployment Alternatives

Fiscal Year (Total obligational authority, in millions of dollars)

	1966	1967	1968	1969	1970	1971	1972	1973	1974	1975	1976	Warheads	Total Devel. & Procurm't Cost a/
HI-MAR													
I	636	2026	2800	2997	1306	599	458	404*				1026	I 10,919
II	636	2096	2960	3711	3364	3431	1046	749	669	691*		2228	II 17,695
III	636	2097	2975	3737	3507	4273	3193	1557	1026	984	1013*	4812	III 25,376
LO-MAR													
I	636	1496	2673	989	615	350	250*					544	I 6,757
II	636	1554	3154	3533	1462	775	541	486*				1273	II 11,745
III	636	1554	3154	3849	3645	1476	876	733	688*			2004	III 16,003
IV	636	1575	3154	3931	3858	3338	1482	1001	892	861*		2713	IV 19,817
NO-MAR													
I	636	932	1476	770	469	259	198*					400	I 4,511
II	636	956	1631	2008	817	505	383	332*				819	II 6,905
III	636	973	1634	2109	1995	780	575	507	459*			1149	III 8,998
IV	636	995	1638	2109	2107	1904	793	666	597	573*		1412	IV 10,894
V	636	1000	1652	2109	2107	2004	1899	878	730	711	689*	1747	V 12,806
VI	636	1000	1652	2109	2107	2004	1979	1939	947	824	784	2062	VI 14,597
Devel. Only	429	370	248	202	117								1,370

* Level off operating cost.

a/ Adds to less than totals of annual system costs because operating costs are not included.

Total development only.

(3) The MSR design will be completed and fabrication will be in an advanced stage.

(4) The SPRINT design will be completed and ground test of at least 10 first and second stage motors will be completed.

These tests would probably indicate whether any major development problems would delay the initial deployment date. By October 1966, before any major production funds are committed, fabrication of the MAR II will have been initiated; fabrication of the MSR will be completed, installation at Kwajelein will be started, and around 10 SPRINT missiles of a tactical configuration will be fired. The development and test program provides considerable insurance that major production funds would not be committed before a resolution of the primary technical uncertainties.

I recommend approval of $390 million for R&D and military construction in FY 1966. Under this funding the installation of the MAR on Kwajalein will be delayed six months. Since the MAR is the single most complex and costly component of the NIKE-X system, I believe the additional development time is warranted. Further, since the MAR follows the first MSR installation in all LO-MAR options this will not result in any slippage of future deployment options. I also recommend $10 million procurement funds to continue pre-production planning and engineering.

As I indicated earlier, I am very reluctant to commit many millions in production funds before we have a clear concept of the preferred deployment.

4. Missile and Space Surveillance Systems.

a. Forward-Scatter Missile Warning System. The Air Force proposed to expand the experimental forward-scatter over-the-horizon radar system now being installed in Europe and Asia to a fully operational system. The experimental system would cover the Soviet missile test ranges and the operational system would cover all of the existing and potential missile sites in the Soviet Union and a large part of China. The experimental system includes two transmitter sites and five receiver sites, and the operational system would include three transmitter sites and 10 receiver sites. The full system would be deployed by end FY 1967 and would be fully operational by end FY 1969. This system promises to be a moderate confidence backup to BMEWS that would provide a few minutes more warning time, detection of some missile trajectories which would avoid BMEWS, and reduced vulnerability to jamming and direct attack. This system would also provide detection of small nuclear detonations in the atmosphere which may not be detected by other sensors. The initial cost of this system would be around $40 million and the annual cost would be around $8 million. I recommend approval of this system with a FY 1966 funding of $4 million, and subject to a review of the operational system characteristics upon completion of the experimental system tests.

c. Satellite Dectection and Tracking. Several other smaller programs will improve our capability for satellite detection and tracking. Two large ground-based optical sensors will be installed within the next year in New Mexico and Hawaii; these sensors will provide a high resolution (limited by atmospheric distortion) and will also provide time-variant measurements of the altitude stabilization of satellites. The data processing from the SPADATS sensors is being improved to provide more accurate ephemeris predictions. The new BMEWS radars in England may be programmed to provide first one-half orbit detection of most Soviet satellites, and this is currently under study.

C. Civil Defense

Civil defense is the foundation of a balanced strategic defense program. A nation-wide fallout shelter system, with the necessary provisions for warning, shelter habitation, and post-attack operations, is the most effective component of a balanced program. An effective fallout shelter program could increase the numbers surviving a Soviet attack in the 1970 period, from among those who otherwise would die, by up to perhaps 20 percent of the total population. Because of the lack of Congressional support, I do not propose to recommend legislation for the shelter development. However, I recommend that in the FY 1967 budget serious consideration be given to the expansion of the civil defense program to provide the basic elements of a nation-wide fallout shelter system by the early seventies. It should be recognized that the presently recommended program is very austere.

The recommended program includes shelter provisions for about 75 percent of the public 155 million shelter spaces and no funds for deployment of an improved civil defense warning system at this time. This austere program, however, could improve our civil defense posture and may be sufficient and approximately balanced for defense against a small attack. A later decision to deploy the other elements of a balanced defense against large attacks must be accompanied by a larger civil defense program. A decision against at least this much civil defense would be tantamount to a rejection of the balanced defense objective.

At the end of this program period, the recommended civil defense program will provide funds for around 155 million shelter spaces, with two weeks of provisions for 100 million people (10 days of provisions for 155 million), and an improved base for shelter management and post-attack recovery. The 155 million spaces include about 80 million spaces anticipated to be licensed and marked as public shelters as a result of the National Fallout Shelter Survey (75 million of these spaces are already licensed or marked); an estimated 19 million spaces from the continued survey of existing buildings; about 3 million spaces for new shelters in Federal buildings; and some 53 million additional spaces from the increased capacity of public shelters made possible by the plumbing modifications and ventilation kits.

The total cost of providing this number of shelter spaces is less than programs considered in prior years, but the effectiveness of this posture is also substantially lower. Total shelter spaces will be distributed more densely than the population, thus increasing the vulnerability of the sheltered population to immediate weapons effects. A slower buildup of the fallout shelter system than considered in prior years, however, is probably appropriate, given the lead times on advanced active defense systems and the uncertain public response. The success of any future expansion of the program will be critically dependent on a clear determination by the Federal Government that such a program is required and on a favorable public response, which, to date, has been erratic and inconsistent. A public understanding that the civil defense program is one of the most effective components of our strategic posture will be requisite to the feasibility and success of achieving even the limited objectives of the recommended program.

Total costs associated with the previously approved and recommended Civil Defense program are as follows:

TOA (In Millions)

	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70	Total FY 66-FY 70
Previously App'd	358	341	349	351	333	-	
Recommended	105.2	194.0	184.1	185.4	152.9	153.4	871.8

During the last year we have achieved a much better understanding of the potential of various strategic defense programs. There remains a great deal of uncertainty concerning some precise immediate and sustained effects of a nuclear attack. The primary uncertainties concern the thermal effects and the immediate post-attack recovery problem. Studies in progress should contribute to a better understanding of these problems. However, these studies are not likely to change the current conclusion that a comprehensive fallout shelter system would provide the potential of saving tens of millions who would otherwise be killed by radiation. The recommended civil defense program outlined in this memorandum is the first step toward making consideration of the problems of post-attack recovery more rewarding and relevant.

APPENDIX P

This appendix summarizes the Recommended Strategic Retaliatory Forces, Continental Air and Missile Defense Forces, and the Civil Defense program. Where different, the Service proposals are shown beneath mine in parentheses. The recommended TOA (in millions) for the Strategic Retaliatory Forces and the Civil Defense Program is also included.

Table I

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	600	600	600	600
						(630)	(630)	(630)	(630)	(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	678	676	674	672
						(710)	(708)	(706)	(704)	(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	54	54	54	54	54
					(108)	(108)	(108)			
Minuteman I			160	600	800	800	700	550	400	250
						(750)	(610)	(480)		(300)
Minuteman II						80	300	450	600	750
						(200)	(390)	(620)	(800)	(900)
Polaris	80	96	144	224	416	448	656	656	656	656
MLF (Polaris A-3)[d]/								8	48	128
								(0)	(0)	(c)
Total ICBM/Pol.	108	174	497	1058	1270	1382	1710	1718	1758	1838
					(1419)	(1601)	(1832)	(1878)	(1978)	(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	2535	2715	2722	2732	2775
					(2801)	(2798)	(2896)	(2938)	(3015)	(3015)
Megatons										

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 U.K. or other nuclear weapons, including the U.K. 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 Retaliatory 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 per cent 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.

RECOMMENDED TOA FOR STRATEGIC OFFENSIVE FORCES
(In Millions)

	FY 62	FY 63	FY 64	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70
Bombers									
B-52	1188.4	991.5	806.7	843.1	871.9	777.1	798.3	741.9	[illegible]
B/EB-47	356.9	268.6	196.6	124.9	54.7				
B-58	162.9	111.0	67.5	102.5	90.5	84.4	36.8	[illegible]	[illegible]
Total	1707.2	1371.1	1070.8	1070.5	1017.1	861.5	835.1	[illegible]	[illegible]
Air Launched Msls									
GAM-77	(140.9)	(43.0)	(57.4)	(26.9)	(39.1)	(39.0)	(32.5)	([illegible])	([illegible])
GAM-87	(146.1)	(130.5)							
Total	(287.0)	(173.5)	(57.4)	(26.9)	(39.1)	(39.0)	(32.5)	([illegible])	(24.5)
Strat Recon									
SR-71		20.3	181.6	367.1	405.8	91.9	94.0	94.0	94.0
RC-135	.6	27.0	156.9	.3	9.5	16.0	20.6	20.3	19.7
RB-47	32.6	18.6	14.9	15.6	9.4				
Total	33.2	65.9	353.4	383.0	424.7	107.9	114.6	[illegible]	113.7
ICBM and FBM System									
Atlas	731.9	456.3	222.9	97.7					
Titan	1159.3	873.9	368.6	127.2	73.8	53.8	49.0	47.6	[illegible]
Minuteman I	1380.9	2046.6	1322.4	133.9	103.8	87.0	71.5	50.1	[illegible]
Minuteman II		151.2	780.6	1211.8	828.3	720.7	[illegible]	564.2	567.5
FBM System	2278.0	1910.0	1851.9	1064.3	950.2	737.6	727.4	[illegible]	710.0
Total	5550.1	5438.0	4546.4	2634.9	1956.1	1599.1	[illegible]	[illegible]	[illegible]
Other									
KC 135	385.5	335.0	221.0	218.0	231.9	233.6	234.3	234.4	224.9
KC 97	171.5	127.4	77.5	51.9	15.3				
Regulus	10.0	11.0	8.8	2.2					
Total	567.0	473.4	307.3	272.1	247.2	233.6	234.3	234.4	224.9
Command, Control, Communications and Support									
SAC Control	98.3	100.5	111.1	72.6	57.9	52.3	51.0	47.2	46.9
PACCS	75.0	97.1	46.8	41.4	35.8	19.1	18.9	18.9	[illegible]
Emer Rocket	11.0	14.0	7.0	29.1	2.4	2.2	.9	.9	.9
Base Oper	719.2	663.7	777.8	788.6	766.5	[illegible]	758.9	[illegible]	[illegible]
Adv Flying and Msl	86.0	60.7	46.4	41.3	40.6	47.1	47.4	[illegible]	[illegible]
Hq and Com Spt	104.0	110.9	107.2	115.1	116.7	111.5	111.5	[illegible]	[illegible]
Total	1093.5	1046.9	[illegible]	1088.1	1019.9	[illegible]	988.6	983.5	[illegible]
Grand Total	8951.0	8395.3	7374.2	5448.6	4665.0	3781.3	3665.0	3535.2	[illegible]
Prev App'd	8961	8378	7318	5649	4892	4144	3544	3209	

CONTINENTAL AIR AND MISSILE DEFENSE FORCES
(End Fiscal Year)

	FY 61	FY 62	FY 63	FY 64	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70
MANNED INTERCEPTORS[a/][b/]:										
Air Force										
F-101	384	312	312	312	282	204 (276)	114 (276)	108 (270)	108 (162)	108 (126)
F-102	393	293	255	235	235 (261)	229 (255)	222 (248)	108 (222)	0 (144)	0 0
F-104			42	42	36	36	24 (36)	24	24	24
F-106	270	276	240	240	240	228	216	210	204 (162)	198 (126)
IMI (F-12A)								0 (18)	0 (162)	0 (216)
Navy										
F-4D	25	27								
Air National Guard[c/]										
F-86	250	200	150	100						
F-89	250	250	225	225	225	125 (225)	0 (175)	0 (175)	0 (25)	0 0
F-100	66	67	72	42						
F-101						72	162	162	162 (108)	162 (126)
-102	130	127	152	191	234 (268)	234 (264)	234 (300)	234 (300)	234 (250)	234 (225)
F-104	61									
F-106									0 (36)	0 (54)
SAM MISSILE FORCES:										
BOMARC[d/]	238	307	383	200 (383)	180 (188)	174 (188)	168 (188)	162 (188)	156 (107)	150 (0)
Nike Hercules (Reg)[e/]	2340	2340	2154	1764	1548	1548	1548	1548	1548	1548
Hawk (Reg)[e/]	0	0	576	576	576	576 (1008)	576 (1440)	576 (1440)	576 (1440)	576 (1440)
Nike Hercules (ARNG)[e/]	108	108	396	756 (648)	936 (864)	936 (864)	936 (864)	936 (864)	936 (864)	936 (864)
Nike Ajax (ARNG)[e/]	1520	1440	720	0	0	0	0	0	0	0
AADS-70										0 (64)
Nike-X										0 (200)[h/]
CONTROL & SURV. SYSTEMS:										
Control Systems										
SAGE Comb. Centers[f/][g/]	8	8	8	7	7	5	5	5	5	5
SAGE Dir. Centers[f/]	20	21	18	15	15	13	13	11	11	11
BUIC II Centers[f/]						14	14	1	0	0
BUIC III Centers[f/][j/]								14	19	19
SAM Fire Coord. Centers	10	28	28	26	26	28	28	28	28	28

CONTINENTAL AIR AND MISSILE DEFENSE FORCES (Cont'd)
(End Fiscal Year)

CONTROL & SURV. SYSTEMS: (Cont'd)	FY 61	FY 62	FY 63	FY 64	FY 65	FY 66	FY 67	FY 68	FY 69	FY 70
Surv. & Warning Systems										
Search Radars i/	177	177	166	168	162	158	152	152	152	152
Search Radars (ANG) f/	6	6	6	6	6	6	6	6	6	6
Height Radars f/	313	313	313	298	278	270	258	258	258	258
Gap Filler Radars f/	87	103	96	100	92	92	92	92	92	92
DEW Radar Stations f/	67	67	67	39	39	39	39	39	39	39
DEW Ext. Sys.-Aircraft	50	44	45	43	20	0	0	0	0	0
-Ships	5	5								
Offshore Rads-Aircraft	60	60	67	67	67	67	67	67	67	67
-Ships	21	22	22	22	19	0	0	0	0	0
Surv. & Warning System										
BMEWS Sites (474-L)	2	2	2	3	3	3	3	3	3	3

a/ **Authorized aircraft or missiles as appropriate.**

b/ The Air Force's force structure recommendations are contingent upon phase-in of the IMI.

c/ Possessed aircraft.

d/ Missiles and launchers.

e/ Numbers of missiles authorized.

f/ Components of 416-L.

g/ For FY 1965 inclues 3 SAGE CC; 1 SAGE CC/DC; 2 Remote CC; 1 Alaskan COC.

h/ 3,400 by end FY 1973.

i/ To be determined during subsequent review.

j/ **This table is written to reflect agreement between the Secretary of Defense and the Air Force on the SAGE/BUIC III configuration rather than the earlier Air Force PAGE recommendation.**

CIVIL DEFENSE PROGRAM
(Service Proposed and SecDef Recommended)

1. Summary of the Recommended Program -- The recommended program, includes the following major elements:

a. A continued survey of existing buildings and new construction is expected to identify about 19 million additional public shelter spaces in addition to over 100 million already identified in shelters with a capacity of 50 or more for a total cost of $52.4 million. Included in this is the cost of evaluating existing and new public shelters for available trapped water, emergency sewerage capacity, available food supplies, communications facilities, and adaptability to the use of portable ventilation equipment. A new program to survey homes and other private buildings with a capacity less than 50 is expected to identify some 24 million additional spaces for a cost of $68.5 million.

b. The recommended shelter development program provides architectural and engineering assistance in applying new techniques for developing shelters at little or no cost in new and existing buildings. In addition it includes funding of community shelter planning through contract with local planning authorities. This program was initiated with $5.8 million in FY 1965, and will cost $3.0 million a year in FY 1966-FY 1970. These expenditures will not require any additional authorizing legislation.

c. To complete the eight Regional Operations Centers which provide emergency direction of the civil defense efforts, $7.8 million is recommended. Furthermore, all Defense Department elements have been directed to make use of the new techniques for inclusion of low cost shelters in construction projects. All other federal agencies should also be directed to make use of these techniques. The most important contribution of this program may be the public response to federal leadership in including such shelters in new and existing buildings.

d. Provision of the basic food and water, medical, sanitation, and radiological instrument kits for around 75 percent of the 155 million public shelter spaces will cost an additional $121.7 million during FY 1966-70. These funds do not provide for the replacement of present stocks subject to deterioration, damage, or loss. The 75 percent stockage factor is based on the stocking experience during the last two years. Minor adaptations to the plumbing systems of the surveyed public shelters to make trapped water available to the shelter areas will cost $12.4 million. Ventilation kits to increase the capacity of surveyed shelters will cost $82.2 million.

e. The recommended warning program includes $2.9 million for the continuation of the Washington area warning system and fallout shelters for the terminal warning points of the national warning system. FY 1965 funds in the amount of $1.1 million are available for completing the development of a radio warning system. An additional $20-$40 million would be required for signal transmission and distribution after determination of the optimum configuration of a national radio warning system. This does not include financing of house receivers which may be funded by the government or by private individuals.

f. An expanded emergency operation program would provide for adequate radiological monitoring kits, continuation of a program for fallout protection for selected emergency broadcast system stations, and continuation of the present capability for collection and processing information on post-attack damage assessment; this program is expected to cost about $15.0 million in FY 1966 and $13.5 million a year in FY 1967-FY 1970.

g. Financial assistance to states is increased at the rate of approximately 10 percent per year through FY 1969 to provide for an increase in state and local activity to support the larger shelter program; the cost of this program will average around $35 million a year.

h. The five-year program for research includes a proposed average expenditure of $15 million a year, four percent of the total program costs. The broad program goals are the following:

(1) To provide improved means for fallout protection, with emphasis on the reduction of the costs of shelter construction;

(2) To evaluate alternative blast shelter programs with attention to techniques to reduce costs and potential deployment times;

(3) To improve the capability to control and conduct emergency operations in damaged areas;

(4) To develop an effective thermal countermeasures system; and

(5) To establish an adequate technical base for post-attack survival and recuperation.

i. Funds for civil defense management are projected at the latest approved manpower ceiling, with adjustments for the recent civilian pay increase; the annual management costs will be about $15 million.