STRATEGIC

DRAFT
November 21, 1962

MEMORANDUM FOR THE PRESIDENT

SUBJECT: Recommended FY 1964-FY 1968 Strategic Retaliatory Forces (U)

I have recently completed my review of the long-range nuclear delivery forces and their associated support for FY 1964-FY 1968. The program recommended will form the basis for the preparation of the FY 1964 budget. This memorandum summarizes the main factors I have taken into consideration in determining United States requirements for these forces.

My recommendations concerning the B-70 program are the subject of another memorandum and these will not be discussed in this paper.

I recommend that you approve, for inclusion in the FY 1964 budget, the development and procurement of the following operational missiles and aircraft to supplement our Long Range Nuclear Delivery Forces:

	Total Purchase Cost to Be Funded	FY 1964 NOA
	(Millions of Dollars)	
a. Development of Improved Minuteman	$366.1	$190.0
b. 150 Improved Minuteman Hardened and Dispersed	$855.0	$396.0
c. 6 Polaris Submarines (Completing planned force of 41)	$936.3	$646.5

After a careful evaluation of the GAM-87 (Skybolt), and for reasons that I shall make clear later in this memorandum, I recommend the cancellation of the program. This action will result in savings of $568 million in FY 1964 and of about $2.5 billion over the period FY 1963-FY 1968, of which about $600 million is for warheads and $1.9 billion is for Skybolt development and production. Further, as a partial offset to this reduction, I recommend approval of 100 additional Improved Minutemen by end-FY 1968.

Moreover, I recommend that we adopt, for planning purposes, the force structure summarized in the following table. Where they differ from my recommendations, the forces proposed by the Services are shown beneath mine in parentheses.

RECOMMENDED AND SERVICE-PROPOSED FORCES [a]

	End-Fiscal Year							
	1961	1962	1963	1964	1965	1966	1967	1968
Bombers								
B-52	555	615	630	630	630	630	630	630
B/E-47	900	810	585	450	225			
B-58	40	80	80	80	80	80	72	66
RS-70								0 (25)
Total Bombers	1495	1505	1295	1160	935	710	702	696 (721)
Air Launched Missiles								
Hound Dog	216	460	580	580	580 (540)	580 (432)	580 (408)	580 (408)
Skybolt					0 (184)	0 (552)	0 (1012)	0 (1012)
Total GAM's	216	460	580	580	580 (724)	580 (984)	580 (1420)	580 (1420)
Surface-to-Surface Missiles								
Atlas	28	77	126	126	126	120	111	99
Titan		44	77	108	108	108	108	108
Minuteman			150	600	800 (900)	800 (900)	800 (850)	800 (750)
Improved Minuteman [b]						150 (300)	350 (800)	500 (1200)
Polaris A-1-2-3	80	144	192	288	464	560	656 (640)	656 (448)
Polaris A3A							0 (16)	0 (208)
Total Missiles	108	265	545	1122	1498 (1598)	1738 (1988)	2025 (2525)	2163 (2812)
Other								
QUAIL	224	392	392	392	392	392	392	392
KC-135 [c]	400	440	500	580	620	620	620	620
KC-97	600	580	340	240	120			
RC-135					23	23	23	23
RB-47 [d]	90	45	45	45	15			
THOR [d]	60	60	60	60	60	60	60	60
JUPITER [d]	45	45	45	45	45	45	45	45
REGULUS	17	17	17	17	5			
Alert Force Weapons								
Weapons	1074	1512	2364	2681	3053 (3254)	3209 (3744)	3455 (4544)	3568 (5227)
Megatons	1771	2710	4441	5420	5556 (5643)	5825 (6509)	6263 (7864)	6577 (8851)

Footnotes - See Page 3

The estimated Total Obligational Authority required to procure and operate these forces over this period is shown in the following table. The difference between the Total Obligational Authority required to finance the forces I am recommending and that required to finance the forces recommended by the individual Services is shown on the second line.

	Total Obligational Authority End-Fiscal Year f/						
	1963	1964	1965	1966	1967	1968	1964-1968
	(Billions of Dollars)						
Secretary of Defense Recommendations	8.64	7.74	5.52	4.68	3.71	3.42	25.07
Service Proposals	+.58	+1.93	+2.26	+3.52	+3.54	+1.25	+12.50

Over the five years, 1964-1968, the complete cost to buy and operate the aircraft and missiles recommended by the Air Force and the Polaris recommended by the Navy exceeds the cost of the forces I am recommending by approximately $12.5 billion, of which about $5 billion is for the RS-70. (The Air Force plan would entail additional costs for the RS-70 in later years.) As will be shown later in this paper, the extra capability provided by the individual Service proposals runs up against strongly diminishing returns and yields very little in terms of extra target destruction. In my judgement, it is an increment not worth the cost of $12.5 billion over the five year period.

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a/ The Service proposed forces, where different from the Recommended forces, are shown in parentheses. The Air Force has also proposed the procurement of the MRBM force, with costs to be shared by NATO. This proposal is not discussed in this memorandum.

b/ Includes 100 Improved Minuteman programmed by FY 1968 in place of the Skybolt missiles.

c/ Includes National Emergency Airborne Command Post and Post-Attack Command and Control System aircraft.

d/ THOR and JUPITER assigned to NATO are not considered as part of the U.S. force in the structure in the discussion in this memorandum.

e/ Bombers have flexibility in the choice of weapons and yields. For purposes of this table, current average loadings are assumed for the B-47's and B-52's; B-58's are assumed to carry planned loadings.

f/ Includes costs of B/RS-70 programs. Excludes MMRBM's.

The forces I am recommending differ from the recommendations of the Joint Chiefs in the following respects. First, the JCS have stated a requirement for an additional 100 operational Minutemen by end-FY 1965. The costs of such an increase in FY 1963 and FY 1964 would amount to approximately $500 million. Second, the JCS recommend a force of 1,200 Minutemen by end-FY 1967. (My recommended force reaches 1,150 by that time.) Third, the Chiefs of Staff of the Army and Air Force, and the Chief of Naval Operations, recommend that the Skybolt program be continued as proposed by the Air Force. The Chairman of the JCS supports my recommendation to cancel this program.

As well as these forces, I recommend that we continue development and procurement of the Post-Attack Command and Control System (PACCS) airborne system and initiation of construction of a Deep Underground Survivable Center. The airborne system consists of 17 airborne command posts (ABNCP's) and 36 B-47 communications relay aircraft. To date, 12 KC-135A command post aircraft are in place and one is maintained continuously airborne. All 17 ABNCP's are scheduled to be in place by June of 1963 and the relay aircraft by May 1963. The KC-135B ABNCP's with improved communications will be in place at the end of 1964. The approved investment costs for the airborne system are $162 million (plus $26 million R&D), with a level-off annual operating cost of $36.5 million. Additional funds will be needed as continued improvements to communications and command center capability evolve.

I recommend initiation of construction for a Deep Underground Command Post for SAC in FY 1964. This would be operational in 1967-1969 and would provide a highly survivable, long-endurance center for post-strike control. The initial cost is estimated to be on the order of $155 million.

The following sections describe in greater detail the basis for my recommendations, by reviewing, first, strategic objectives, the Soviet-Bloc nuclear threat and our target destruction capabilities, general nuclear war outcomes, and second, the particular key decisions to be made this year.

I. General Basis for Force Level Recommendations

In order to provide a firm basis for determining the capabilities of Strategic Retaliatory Forces in general nuclear war missions, I asked the Chairman of the Joint Chiefs of Staff to establish a Special Studies Group which would have, as one of its tasks, to examine strategic objectives and force requirements on a continuing basis. This Group analyzed the comparative capabilities of alternative strategic forces for the 1968 period. These studies, in addition to other studies by the Services and my staff, supplemented the advice of the Joint Chiefs and, together with that advice, provided the basis for my recommendations.

General Nuclear War Objectives

The forces I am recommending have been chosen, primarily, to satisfy two requirements. They are, first, to provide the United States with a secure, protected retaliatory force able to survive any attack within enemy capabilities and capable of striking back and destroying Soviet urban society, if necessary, in a controlled and deliberate way; and, second, to deny the enemy the prospect of achieving a military victory by attacking our forces. The forces I am recommending should thereby give any rational Soviet decision-maker the strongest possible incentives to avoid a nuclear attack on ourselves or our allies.

However, I recognize that despite our possession of a most powerful deterrent, nuclear war may break out in an accidental or unpremeditated way, or as the consequence of enemy irrationality or miscalculation. Therefore, I believe that we should take all measures that offer a reasonable prospect of effectively limiting damage to ourselves and our allies in the event that deterrence fails and thermonuclear war does occur. Such measures include active anti-bomber and anti-missile defenses and civil defenses. Strategic offensive forces can also make an important contribution by striking back against Soviet bomber bases, missile sites, and other vulnerable elements of Soviet follow-on forces. In some circumstances, our counterattack may succeed in blunting the Soviet attack and make a substantial contribution to the damage-limiting objectives. The forces and programs I am recommending meet this requirement.

It has become clear to me that the Air Force proposals, both for the RS-70 and for the rest of their Strategic Retaliatory Forces are based on the objective of achieving a first-strike capability. In the words of an Air Force report to me:

> "The Air Force has rather supported the development of forces which provide the United States a first-strike capability credible to the Soviet Union, as well as to our Allies, by virtue of our ability to limit damage to the United States and our Allies to levels acceptable in light of the circumstances and the alternatives available."

Of course, any force designed primarily for a controlled second-strike, and for the limiting of damage to the U.S. and its Allies, will inevitably have in it to an important degree a first-strike capability. What is at issue here is whether our forces should be augmented beyond what I am recommending in an attempt to achieve a capability to start a thermonuclear

war in which the resulting damage to ourselves and our Allies could be considered acceptable on some reasonable definition of the term.

In my memorandum to you on this subject last year, I defined a "full first-strike capability" as a capability that "would be achieved if our forces were so large and so effective, in relation to those of the Soviet Union, that we would be able to attack and reduce Soviet retaliatory power to the point at which it could not cause severe damage to U.S. population and industry." I indicated then and I reaffirm now my belief that the "full first-strike capability" -- and I now include the Air Force's variant of it -- should be rejected as a U S. policy objective. This is for several reasons.

a. It is almost certainly infeasible.

By this I mean that the same means for achieving a secure, protected retaliatory force able to survive any attack and be capable of striking back, that we are using are also available to the Woviets. In particular, I was recently informed by the JCS that the Soviet Union now has a submarine-launched ballistic missile (SLBM) capability which, if unopposed, would permit deployment of nearly 100 missiles against CONUS. The Soviets also have submarine-launched cruise missiles. The NIE now estimates that by mid-1967, the Soviets will have some 186 SLBM's and 156 cruise missiles. Although we have an effective capability to sink enemy submarines in a protracted war at sea, we have no realistic prospect of being able to destroy a major part of deployed enemy SLBM forces in a sudden attack, thereby preventing Soviet retaliation after a U.S. attack. Moreover, like ourselves, the Soviets can harden their land-based missiles. Recent intelligence indicates that they are beginning to harden both their

IRBM's and their ICBM's. They have the further option of protecting these forces with active ballistic missile defenses, a choice which appears uneconomic to us, but which may be attractive to them. There is a problem of uncertainty of location of some of their missile sites. Furthermore, I am convinced that we would not be able to achieve tactical surprise, especially in the kinds of crisis circumstances in which a first-strike capability might be relevant. Thus, the Soviets would be able to launch some of their retaliatory forces before we had destroyed their bases.

Finally, it is clear to me that the forces proposed by the Air Force itself cannot give us this capability. For example, in mid-1968, under very favorable circumstances, the Air Force proposed force would at best be able to reduce Soviet strategic forces to roughly 100 surviving ICBM's (for example, assume that we locate and target about 93 per cent of a force of 700 missiles and destroy in time about 93 per cent of the missiles we target). In addition, approximately 100 submarine-launched missiles could be at sea. If these remaining forces were targeted against U.S. cities, they could inflict roughly 50 million direct fatalities in the United States, even with fallout protection. I do not consider this an "acceptable" level of damage.

I have said <u>almost</u> certainly infeasible because I can think of at least two reasons why it might not prove to be infeasible. First, the Soviets could blunder and leave themselves vulnerable to a U.S. first-strike. I do not consider this to be a very likely possibility. As I indicated earlier, already the Soviets are deploying SLBM's and hardened ICBM's and IRBM's. Moreover, even if they were to be so foolish as to

leave themselves vulnerable to a U.S. first-strike, because of the presence of diminishing returns in target destruction, the extra forces proposed by the Air Force do not appear to add a great deal. The possible circumstances in which the Air Force proposed forces would provide the U.S. with a good first-strike capability and those proposed by me would not seem unclear and improbable.

Secondly, one might argue that we could hope to achieve a satisfactory outcome by combining a good first-strike capability with a coercive strategy. That is, we might try to knock out most of the Soviet strategic nuclear forces, while keeping Russian cities intact, and then coerce the Soviets into avoiding our cities (by the threat of controlled reprisal) and accepting our peace terms. In this case we would be counting on our ability to destroy their will, not their ability, to destroy our cities. I believe that the coercive strategy is a sensible and desirable option to have in second-strike circumstances in which we are trying to make the best of a bad situation. There the only justification it requires is a reasonable possibility that it might work. But it would be foolish to count on it working to the point that it would form the basis for a belief that we could strike first without retaliation. Moreover, there are limits to the extent to which extra strategic retaliatory forces help in these circumstances once we have a protected capability to destroy essentially all of their urban society.

b. It is neither necessary nor particularly useful.

The threat of a U.S. first-strike has long since been shown to be ineffective in deterring limited provocations and aggression. Therefore, it has been necessary to build up our theatre forces to levels at which

they would be adequate to meet our commitments without resort to nuclear weapons. We have made a great deal of progress toward this objective in the past two years, and we plan further progress.

c. It would be extremely costly.

A "full" or "credible" first-strike capability, even if feasible, would cost much more than the costs of the Air Force proposed Strategic Retaliatory Forces. As well as much larger and more effective Strategic Retaliatory Forces, such a capability would require very large expenditures on Civil Defense and Continental Air and Missile Defenses.

For these reasons, the following discussion is limited to evaluation of the recommended and alternative forces in second-strike conditions. Although I examine the capability of these forces to destroy Soviet military targets in a second-strike, I want to make it clear that an ability to destroy 100 per cent of these targets is not one that I think we can possibly attain. Rather, I believe that we should stop augmenting our forces for this purpose when the extra capability the increments offer is small in relation to the extra costs.

The Soviet Long-Range Nuclear Threat

We have intelligence estimates of the Soviet strategic forces through 1967.[a/] These estimates have been extrapolated for 1968 in the following table which summarizes the size and composition of the Soviet forces. The Low numbers represent the smallest force estimated by USIB; the Medium numbers correspond to the upper bound of the range projected by USIB; the High force corresponds to the upper bound of the range indicated by the Air Force in its dissent from the majority view.

SOVIET STRATEGIC RETALIATORY FORCES

	Intelligence Estimates						Extrapolation		
	Mid-1966			Mid-1967			Mid-1968		
	Low (NIE) (Low)	Med. (NIE) (High)	High (AF) (High)	Low (NIE) (Low)	Med. (NIE) (High)	High (AF) (High)	Low	Med.	High
Oper. ICBM Launchers									
Soft	150	250	300	150	250	300	150	250	300
Hardened	125	250	200	125	250	200	125	250	200
Fully Hard	(Few)	25	150	25	100	300	100	200	450
Total	275	525	650	300	600	800	375	700	950
Oper. IRBM Launchers									
Soft a/	550	650	650	550	650	650	550	650	650
Total	550	650	650	550	650	650	550	650	650
Submarine-Launched Forces									
Ballistic Missiles		174			186			198	
Cruise Missiles		132			156			192	
Total		306			342			390	
Bombers and Tankers									
Heavy		120	200		105	200	90	120	200
Medium		800	800		750	750	700	700	700
Total		920	1000		855	950	790	820	900

a/ Intelligence recently received indicates that the Soviets are not hardening their IRBM launchers.

The principal defensive weapon systems that the Soviets are estimated to have deployed in the 1966-1968 period are:

(1) SA-2;

(2) SA-3;

(3) fighter interceptors for anit-bomber defense; and,

(4) anti-missile defense system against an MRBM/IRBM and ICBM threat.

The present generation Soviet ground-to-air missile, the SA-2, is similar to the U.S. Nike-Hercules. We expect the Soviets to have deployed about 600 SA-2 batteries in 1966-1968. This system has a good capability against bombers at moderate altitudes, but its low altitude capability is minimal. An improved SA-2 may have an intercept capability against high-altitude non-ballistic air-to-surface missiles. This system is also estimated to have some minimal capability against tactical missiles launched 50-150 miles away. Some of the improved SA-2's may be configured for mobile operations.

The SA-3, Hawk-type system, is estimated to be designed to intercept low-altitude penetrators (including high speed low-altitude ASM's). We expect roughly 400-800 SA-3 batteries to be deployed in 1968.

The current generation Soviet interceptors have airborne intercept radars with track/search ranges much smaller than comparable U S. fighters. Improvements are expected when advanced all-weather interceptors are phased into the operational inventory. The Soviet fighter system is dependent on ground controlled intercept radars for terminal vectoring to targets. Like our own, the ground direction centers are vulnerable to ballistic missile attack. The effectiveness of Soviet interceptors against air-launched missiles, and to a lesser extent against bombers, is expected to be small, not because of terminal performance considerations, but because of the difficulties encountered by interceptors in acquiring targets within a degraded ground environment.

The Soviets are known to be working on an anti-MRBM/IRBM system, designated the AM-1, that is believed to be effective against ballistic missiles launched from 300-1000 n.mi. It is believed that the Soviets are currently deploying this system around Leningrad and future deployment is possible in the 1963-1964 time period. The system may be made transportable. The AM-1 is considered capable, under favorable conditions, of engaging an ICBM re-entry vehicle. However, the capability of the AM-1 does not seem sufficient to warrant deployment to targets threatened only by the ICBM.

The Soviets are also believed to be making a major effort to develop a single ABM system, designated AM-2, for defense of the "homeland" against all strategic ballistic missile threats, IRBM's, ALBM's, and FBM's, as well as ICBM's. This system could probably be initially deployed some time in the 1965-1966 time period. For purposes of the calculations which follow, we have assumed 20 ABM batteries deployed in 1968.

The following table shows a projected Soviet-Bloc target list for end-FY 1968. The list is based on the one used by the JCS Special Studies Group for their Strategic Nuclear Study, but includes the high projection of the USIB for the number of Soviet missile launchers. The numbers of weapons assigned to these targets are the numbers used in the calculations summarized later in this memorandum. They can be taken as an approximate expression of the way in which the numbers of weapons in the forces I am recommending (Force I) and the forces the Services propose (Force II) might be allocated to targets.a/

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a/ The breakdown of these weapons by various types of weapon system can be found in the Appendix to this memorandum.

SOVIET BLOC TARGET LIST
(Median Assumptions)

	End-Fiscal Year 1968		
	No. of Targets	Weapons Assigned Force I	Force II
Strategic Nuclear High Urgency			
Soft Targets			
Primary Bomber, Dispersal & Fighter Control	200	400	533
ICBM-Soft	125	220	284
MRBM/IRBM	162	286	316
Space System Control	5	10	10
Sub-Total	492	916	1143
Hardened Targets			
ICBM-Hardened	125	138	198
ICBM-Fully Hardened	200	396	669
Submarine Bases	30	38	38
Offensive Controls	10	13	13
Sub-Total	365	585	918
Strategic Nuclear Moderate Urgency			
Soft Targets			
Bomber Capable Fields	110	220	248
Air Defense Fields	100	100	300
Missile Storage	20	40	40
Nuc/CBR Production	30	60	60
SAM Sites	(350)[a/]	406	775
Sub-Total	260	826	1423
Hardened Targets			
Nat/Regional Nuclear Storage	68	262	363
Other Nuclear Storage	115	315	482
Sub-Total	183	577	485
Urban-Industrial	210	349	349
Total	1510	3253	4678

a/ Not included in totals of targets killed.

Second-Strike Effectiveness

Using the high and moderate urgency Soviet-Bloc target list and the operational factors shown in the Appendix, the expected target destruction capabilities of the alternative Strategic Retaliatory Forces were derived for a controlled retaliatory mission for the 1968 period. The effectiveness of the U.S. second-strike missile attack was developed for the varying Soviet-Bloc threat and is shown as the "quick kill" capability of the force considered. The effectiveness of the follow-on manned bomber attack was also developed and the combined target destruction capabilities of the total force is shown as "ultimate kill" capability. Because the bombers are dependent on warning and alert response for their survival, differentiating the destruction capabilities in this manner allows the comparison of the effectiveness of the U.S. second-strike under conditions of "tactical warning" and "inadequate warning." For the mid-1968 period, 295 Polaris missiles and 54 Titan II missiles were held as a protected reserve for possible attacks against Soviet-Bloc urban-industrial areas.

The second-strike effectiveness of attacks against Soviet-Bloc strategic military targets by the Recommended and Service proposed strategic forces is shown in the table below. The results are shown for the median Soviet-Bloc target structure and median operational factors for the U.S. forces. For both forces, the Improved Minuteman was assumed to utilize its retargeting capability based on "good guidance" indicators. The effects of varying the assumptions about the number of targets and the U.S. operational factors are shown in similar tables in the Appendix.

EXPECTED SECOND-STRIKE TARGET DESTRUCTION CAPABILITIES
(Median Assumptions)

	End-Fiscal Year 1968				
		Targets Destroyed [a]			
	No. of Targets	Force I		Force II	
		Quick	Ult.	Quick	Ult.
Strategic Nuclear [b]					
High Urgency					
Soft	492	418	418	418	445
Hardened	365	245	262	287	313
Moderate Urgency					
Soft	260	0	113	101	214
Hardened	183	8	38	42	65
Total	1,300	671	831	848	1,037 [c]
Urban-Industrial					
Per cent Industry Destroyed			55		60

a/ Assumes all Improved Minutemen use good guidance indicators and can be retargeted.

b/ The analysis assumes that 20 per cent of the Soviet targets are within ABM coverage, and that 12 per cent of the missile sites have varying degrees of locational uncertainty.

c/ Includes the destruction of targets by 16 alert RS-70's.

General Nuclear War Outcomes

The discussion of general nuclear war outcomes in mid-1968 will be limited to wars initiated by the Soviet Union, and to the median assumptions. The outcomes are measured in civilian and industrial damage, and in reserve and recoverable forces surviving the first exchange. Two Soviet attack strategies

are considered: first, a counter-military attack in which only weapons targeted against hardened targets are ground burst, and, second, a mixed military and urban-industrial attack in which weapons are ground burst. Results of this analysis are summarized below. In both years, existence of an improvised fallout protection program is assumed.

SUMMARY OF NATO DAMAGE UNDER A SOVIET STRIKE -- 1968

	United States			Western Europe		
	Fat. (# in Mils.)	Cas.	Ind. (%)	Fat. (# in Mils.)	Cas.	Ind. (%)
Soviet First-Strike On						
Military & Urban-Indl. Targets	95	125	60	100	130	N/A
Military Targets Only	30	45	10	10	15	N/A

a/ A civil defense and a shelter incentive program is assumed to exist with a median residual protection number between .05 and .1. Ninety per cent of the population is assumed to be protected in this manner. In the absence of a civil defense program, between 80 and 85 per cent of the U.S. population (estimated at 210 million) could be potential casualties in the case in which cities are targeted.

b/ The population of Western Europe is estimated at 275 million. The calculation assumes that 40 per cent of the population receives radiation dosages consistent with a median residual protection number of .5 and 60 per cent are afforded median protection numbers varying between .1 and .2.

The Soviet damage resulting from the U.S. retaliatory attacks by the Recommended Force (Force I) and the Service proposed force are shown in the following table. For the retaliatory attack on military targets, 295 Polaris missiles and the surviving Titan II's are used on urban-industrial targets. The Soviets are assumed to have a fallout protection program.

SUMMARY OF SOVIET DAMAGE UNDER A U.S. RETALIATORY STRIKE -- 1968

	Soviet Union [a]					
	Fatalities		Casualties		Industry	
	I	II	I	II	I	II
	(Nos. in Millions)				(Per cent)	
U S. Retaliatory Strike On						
Military & Urban-Indl. Targets	83	86	107	110	50	55
Military Targets Only	17	25	27	37	9	15

a/ The Soviet population is estimated at 230 million. Twenty per cent of the population is assumed afforded a median protection number of .5, while 80 per cent are afforded a median protection number of .1. In the absence of fallout protection at least 70 per cent of the population could be potential casualties under urban-industrial attacks.

Under median assumptions the residual forces after the initial exchanges including the execution of urban-industrial attacks by each of the belligerents are shown below. The results are for the case in which the U.S. bomber force receives tactical warning.

RESIDUAL FORCES AFTER INITIAL EXCHANGES -- 1968

	United States		Soviet Union	
	Force I	Force II	Force I	Force II
Bombers	95	100	30	30
ICBM's	65	85	25	20
Sub/Missiles	30	30	20	20

II. Basis for Recommendations on Particular Weapon Systems

Within the general quantitative requirements for long range nuclear delivery systems discussed above, the following are the reasons for my specific program recommendations.

Skybolt (GAM-87)

The Air Force has proposed, in its revised program submission, the procurement of 22 squadrons (46 total and 32 alert missiles per squadron) of Skybolt to be operational by end-FY 1967. By the end of FY 1965, 4 squadrons of Skybolt could be operational. There has been slippage both in the estimated time and costs required to complete this program. The R&D costs, originally estimated to be a small fraction of that amount, are now estimated to be $492.6 million, and there is reason to believe that further increases are likely. In the six month period (February 1962 submission to June 1962 submission) the total estimated procurement costs increased from $1,426.4 million to $1,771.0 million, an increase of 24 per cent.[a/] I have felt for some time now that Skybolt was a questionable program.

The Skybolt system combines the disadvantages of the bomber with those of the missile. Being associated with the bombers, it shares their vulnerability on the ground and their slow over-all time-to-target. The vulnerability of our bomber force remains a problem. The sudden appearance in Cuba of ballistic missiles capable of reaching all SAC bases with flight time so short as to make tactical warning based on detection of missile launchings practically unusable, and the recent appearance of a Soviet trawler, with a previous history of cable cutting, over our BMEWS cables, has underlined once again the undesirability of dependence on the tactical warning plus alert response mechanism for the protection of our strategic forces.

a/ Warhead costs are not included.

But the Skybolt does not share the advantages of the bomber. Rather, it has the inaccuracy and relatively low payload characteristic of missiles. That is, it has the disadvantages of missiles without their advantages (quick time-to-target plus protectior through hardening and dispersal or continuous peacctime mobility).

The value of Skybolt is to be found primarily in the defense suppression role. Skybolt is not a good choice as a weapon system for attacking high priority military targets because it takes hours to reach its targets and is vulnerable on the ground. It is not a good choice for counter-city retaliation because of the low survival potential in the wartime environment of the bombers that carry it, and the fact that they have to be committed to attack, if at all, early in the war. However, for defense suppression, Skybolt would be a good choice if it had a substantial cost advantage over other systems that might do that mission. But the recent and continuing slippages in that program have called that advantage into question.

The number of defense suppression targets that it will be necessary to attack to allow penetration of our bombers in the later 1960's is uncertain. Various studies have been done suggesting numbers between 100 and 300. Of course, there is an upper limit to the number it makes sense to attack. For example, if it were necessary to destroy 300 targets in order to permit the bombers to penetrate and destroy 500 other targets, the question would naturally arise as to whether it wouldn't make more sense to direct the whole effort at the destruction of the 500 "primary" targets themselves. Defense suppression can price itself out of the market.

However, suppose the number is about 300. If we go ahead with Skybolt, by mid-1967, we would have about 976 air-launched missiles on alert (272 Hound Dog and 704 Skybolt), at a remaining development and procurement cost of about $1.9 billion. This would enable us to program two air-launched missiles at each defense suppression target and still have 376 left over for other low priority military targets.

Alternatively, if we cancel Skybolt, by making maximum use of existing resources, we can retain about 400 Hound Dogs on alert. I believe that these 400 missiles plus 100 extra Minutemen can do the defense suppression job satisfactorily, and that the other air-launched missiles are not required. This would permit the assignment of either two Hound Dogs or one Minuteman to each of the 300 targets. The total initial investment cost of the 100 extra Minutemen will be approximately $500 million. There is concern that the recent announcement of the U.K. decision to phase-out the Thor weapon system has increased the British dependence on Skybolt. There has been no official commitment for Skybolt by the U.K., and their expenditures on the system so far have been very small. The U.K has initially stated, for planning purposes, a requirement for about 180 missiles for their Vulcan bomber force. This requirement has recently been reduced to 100 missiles. For the British, a deployment of other weapon systems could take the place of Skybolt, achieving the same deterrent at a lower cost than maintaining their bomber force. The possibility of providing alternative nuclear forces is under study.

One of the most frequently used arguments for Skybolt is that "it extends the usefulness of the manned bomber." In the sense that, by doing defense suppression it permits the bombers to penetrate, the argument is

correct; but Skybolt is by no means unique in this role. As I have just indicated, this task can be performed satisfactorily at much less cost in other ways. But in any other sense, I believe the argument is wrong. The appropriate objective for the design of our strategic retaliatory force is to be able to destroy the required number of targets at a minimum cost; it is not to prolong the lives of particular weapon systems beyond the point at which their continued operation is no longer compatible with that objective.

Improved Minuteman

The Air Force has proposed an Improved Minuteman which would be phased into the operational inventory in FY 1966. The Improved Minuteman is to have approximately twice the yield and half the CEP of the original Minuteman, plus provisions for multiple targets, remote launching, and for carrying trajectory prediction systems, and additional safety features. The RDT&E program leading to the development of the Improved Minuteman has been approved, and I recommend inclusion of $190 million of RDT&E funds in the FY 1964 budget for this purpose.

The Air Force proposed for planning purposes a FY 1966 force size of 900 Minutemen and 300 Improved Minutemen. By FY 1968 the Minuteman force would consist of 750 Minutemen and 1,200 Improved Minutemen.

I recommend that additional Minutemen missile sites beyond the 800 force level be in the Improved configuration. For planning purposes, I recommend 800 Minutemen and 500 Improved Minutemen by end-FY 1968.

Polaris A-3A

The Navy has proposed the development of a Polaris A-3A missile. The proposed program would have 368 A-3A missiles and 288 A-3 missiles in

submarines by FY 1969 at an additional cost of $1.6 billion. The A-3 missile has approximately 300 lbs. available for decoys; the A-3A has approximately 920 lbs. available for decoys at the same ranges. Although I believe that further development of a more advanced Polaris missile may be desirable, I do not believe that the extra capabilities offered by the A-3 missile, by comparison with the A-3, are worth the cost of development and procurement. Therefore, I recommend that the Navy proposal be disapproved.

Polaris A-3 and Support

The Navy has proposed the following changes in the approved program:

a. To reduce the cost of the six SSBN's from $720.3 million to $714.8 million.

b. To defer the construction of one of the two AS(FBM) support ships until FY 1965. Planned operational commitments permit this deferral.

c. In addition to the two new construction AK(FBM) now approved, two more are proposed, one each in FY 1967 and FY 1968. Two AK(FBM) conversions now assigned to the Polaris fleet would be returned to the General Purpose Forces upon the entrance into the force structure of the last two new construction AK(FBM)'s.

The Navy justifies the new construction AK's on the basis that they would have the capability of loading missiles (in calm waters) directly into SSBN's. The converted AK's cannot do this. Currently, only the tenders are capable of storing and loading missiles. The rationale for this is that the tenders would, with high probability, be destroyed in a nuclear attack. In this event, surviving Polaris boats could rendezvous at predesignated locations with surviving AK's for missile reloading.

I recommend that repricing of the SSBN's and the proposal to defer construction of one AS(FBM) be approved. I further recommend that the AK(FBM) conversion for FY 1964 be approved at a cost of $8.5 million, but that the proposed program for new construction AK(FBM)'s be disapproved. In lieu of these four new construction ships, the two converted AK(FBM)'s currently in the fleet should be retained in this use, and two additional AK(FBM) conversions should be scheduled, one each in FY 1965 and FY 1966 at a total cost of $17 million. Because of the uncertainty as to the number of AK(FBM)'s that would survive a nuclear attack, and the fact that the reload capability would not come into being until FY 1967-1970, by which time large numbers of Minutemen missiles will be available, I do not believe that the reload capability provided by the new construction AK(FBM)'s is worth the extra cost. Moreover, a program of conversions rather than new construction will permit the required force of six AK(FBM)'s to be achieved one year earlier, which will bring it into phase with the rest of the FBM force structure.

In addition to the shipbuilding costs of $131 million, the Navy proposal would require an expenditure of about $234 million for reload missiles.

Regulus and SLAM Submarines

The Navy proposed to program nuclear submarines equipped with the nuclear powered SLAM (Supersonic Low Altitude Missile) system, as a follow-on to Regulus and complement to Polaris. Retention of one Regulus until it could be converted to SLAM, and new construction of one SLAM SSGN in FY 1967 and two in FY 1968 were proposed.

I recommend that the proposal to retain the SSGN for conversion to SLAM and the new construction SLAM SSGN's be disapproved; and that the Regulus force phase-out be completed by the end of FY 1965 as currently planned. I believe that the presently uncertain R&D status of SLAM makes any plans for SLAM submarines premature.

DRAFT
November 21, 1962

APPENDIX I TO THE MEMORANDUM FOR THE PRESIDENT

SUBJECT: Recommended FY 1964-FY 1968 Strategic Retaliatory Forces (U)

The table on the next page shows the operational factors used in the analysis. The probability of a missile or aircraft delivering its weapon to target is expressed as the product of four factors:

a. Peacetime readiness rate of the alert or on-station force, or RR.

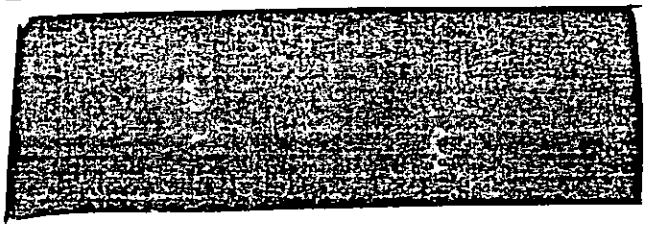
b. Survival rate under enemy attack, or SR.

c. Reliability rate, or R.

d. Penetration rate through enemy defenses, or PR.

For any given Soviet force level, the survival rate of our forces will vary with our force size. The factors shown here were calculated on the basis of the Soviet force projections shown on page 11, with the optimistic factors corresponding to the low Soviet force, the pessimistic corresponding to the high force.

There is flexibility in the weapons loadings for the B-52 and B-58 bombers. The total loading assumed is as follows:



The ASM's and Atlas and Titan missiles are assumed to carry currently programmed weapons. Minuteman is also assumed to carry currently programmed weapons, except that some of the Minuteman and Improved Minuteman were assumed to carry a 250 KT warhead when assigned to military targets near major urban-industrial areas, in order to reduce collateral civilian damage.

READINESS, SURVIVAL, RELIABILITY AND PENETRATION FACTORS BY WEAPON SYSTEMS

	End-FY 1968		
	Optimistic	Median	Pessimistic
Alert B-52/B-58			
RR	1.0	1.0	1.0
SR	1.0	.75	.25
R	.9	.8	.7
PR	a/ (Dependent on success of defense suppression roll-back.)		
Skybolt on Alert B-52			
R	.85	.7	.6
PR (Defended Targets)	1.0	.5	.1
PR (Undefended Targets)	1.0	1.0	1.0
GAM-77/77A On-Alert B-52's			
R	.83	.70	.6
PR (Defended Targets)	.9	.7	.35
PR (Undefended Targets)	1.0	1.0	1.0
Alert RS-70			
RR	1.0	1.0	1.0
SR	1.0	.85	.7
R	.9	.85	.8
PR	a/ (Dependent on success of defense suppression roll-back.)		
Strike Missiles on RS-70's			
R	.9	.80	.7
PR (Defended Targets)	1.0	.85	.8
PR (Undefended Targets)	1.0	1.0	1.0
Atlas D (Soft)			
RR	.95	.93	.90
SR	.05	.05	.05
R	.80	.75	.70
PR (Defended Targets)	1.0	.8	.3
PR (Undefended Targets)	1.0	1.0	1.0

a/ Calculated for each force on the basis of number of SAM sites and offensive fighter bases destroyed.

READINESS, SURVIVAL, RELIABILITY AND PENETRATION FACTORS BY WEAPON SYSTEMS
(Continued)

	End-FY 1968		
	Optimistic	Median	Pessimistic
Atlas E			
RR	.95	.90	.85
SR	.05	.05	.05
R	.80	.75	.70
PR (Defended Targets)	1.0	.7	.3
PR (Undefended Targets)	1.0	1.0	1.0
Atlas F			
RR	.95	.90	.85
SR	.05	.05	.05
R	.80	.75	.70
PR (Defended Targets)	1.0	.7	.3
PR (Undefended Targets)	1.0	1.0	1.0
Titan I			
RR	.95	.90	.85
SR	.15	.05	.05
R	.80	.75	.70
PR (Defended Targets)	1.0	.7	.3
PR (Undefended Targets)	1.0	1.0	1.0
Titan II			
RR	.95	.90	.85
SR	.15	.05	.05
R	.80	.75	.70
PR (Defended Targets)	1.0	.7	.3
PR (Undefended Targets)	1.0	1.0	1.0
Minuteman			
RR	.95	.95	.9
SR	1.0	1.0	.95
R	.85	.80	.75
PR (Defended Targets)	1.0	.6	.2
PR (Undefended Targets)	1.0	1.0	1.0
Minuteman (Improved)			
RR	.95	.95	.9
SR	1.0	1.0	1.0
R	.85	.80	.75
PR (Defended Targets)	1.0	.8	.3
PR (Undefended Targets)	1.0	1.0	1.0

READINESS, SURVIVAL, RELIABILITY AND PENETRATION FACTORS BY WEAPON SYSTEMS
(Continued)

	End-FY 1968		
	Optimistic	Median	Pessimistic
On-Station Polaris A-3			
RR	.95	.95	.9
SR	1.0	1.0	1.0
R	.80	.75	.75
PR (Defended Targets)	1.0	.6	.2
PR (Undefended Targets)	1.0	1.0	1.0
On-Station Polaris A-3A			
RR	.95	.95	.9
SR	1.0	1.0	1.0
R	.75	.75	.70
PR (Defended Targets)	1.0	.8	.3
PR (Undefended Targets)	1.0	1.0	1.0

2. Weapon Assignment

The Weapons allocated to the various classes of strategic targets by weapon system types, i.e., surface-to-surface missiles (SSM's), air-to-surface missiles (ASM's), and gravity bombs (GB's) are shown below. It is assumed that all missile systems had the capability for the reprogramming of non-ready missiles. In the case of the RS-70 strike missiles, all available strike missiles surviving to the missile release line were assigned to targets.

SOVIET BLOC TARGET STRUCTURE
(Median Assumptions)

	No Def/Def/Unk[a]	End-FY 1968 Weapons Assigned					
		SSM Force		ASM[b] Force		GB Force	
		I	II	I	II	I	II
Strategic Nuclear High Urgency							
Soft Targets							
Primary Bomber, Disp. & Fighter Cont.	160/40/0	400	400	0	133	0	0
ICBM-Soft	88/22/15	220	220	0	42	0	22
MRBM/IRBM	115/28/19	286	286	0	30	0	0
Space System Control	4/ 1/ 0	10	10	0	0	0	0
Hardened Targets							
ICBM-Hardened	94/16/15	138	138	0	28	0	32
ICBM-Fully Hard	149/27/24	220	440	0	53	176	176
Sub. Bases	24/ 6/ 0	38	38	0	0	0	0
Off. Controls	8/ .2/ 0	13	13	0	0	0	0
Strategic Nuclear Moderate Urgency							
Soft Targets							
Bomber Capable	88/22/ 0	0	138	0	43	220	67
Air Defense	80/20/ 0	0	0	0	100	100	200
Missile Storage	16/ 4/ 0	0	0	0	0	40	40
Nuc/CBR Prod.	21/ 9/ 0	0	0	0	0	60	60
SAM Sites	(280/70)	0	0	406	775	0	0
Hardened Targets							
Natl.Reg.Nucl.Stor.	52/14/ 0	102	185	0	4	160	174
Other Nucl. Stor.	92/23/ 0	89	271	0	0	226	211
Urban-Industry & Govt. Controls	190/20/ 0	349	349	0	0	0	0

a/ No. Def. represents number of targets not within ABM coverage; Def., number of targets within ABM coverage; Unk., number of targets with location not precisely known.

b/ Includes 232 RS-70 strike missiles assigned to targets.

3. Target Destruction Capabilities

The table below shows the comparative performance of the Recommended Force and Service proposed forces under optimistic and pessimistic assumptions.

EXPECTED SECOND-STRIKE TARGET DESTRUCTION CAPABILITIES
(Optimistic and Pessimistic Assumptions)

	No. of Targets		End-Fiscal Year 1968 Targets Destroyed [a]							
			Force I				Force II			
			Quick		Ultimate		Quick		Ultimate	
	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
Strategic Nuclear [b]										
High Urgency										
Soft	418	555	407	331	407	331	407	331	415	363
Hardened	203	590	184	227	184	234	195	350	202	354
Moderate Urgency										
Soft	260	260	63	0	233	13	255	85	259	101
Hardened	183	183	17	5	65	7	47	35	123	37
Total	1064	1588	671	563	889	585	904	801	999[c]	855[c]
Urban-Industrial										
Per cent Industry Destroyed					57	30			63	35

a/ Assumes all Improved Minutemen use good guidance indicators and can be retargeted.

b/ The analysis assumes for the Optimistic case that even though 20 Urban-Industrial areas are afforded ABM defenses, the defenses are essentially point defenses and afford no coverage for military targets. Also in the Optimistic case, it is assumed that there is no locational uncertainty associated with missile sites. For the Pessimistic case, 30 per cent of the Soviet targets are within ABM coverage, and 18 per cent of the missile sites have varying degrees of locational uncertainties.

c/ Includes the destruction of targets by 16 Alert RS-70's.

4. General Nuclear War Outcomes

In the text of the memorandum, representative general nuclear war outcomes were shown for the major belligerents under median assumptions concerning Soviet strategic force levels, and U.S. performance factors. Calculations of war outcomes are necessarily subject to great uncertainties. Blast and thermal effects are local, and calculations based on them can yield useful and fairly reliable bounds on direct and indirect civil damage. The casualties and fatalities resulting from radioactive fallout are subject to greater uncertainties. Uncertainties as to the number of weapons targeted against the major belligerents, their yields and location of bursts, fission-fussion ratios, distribution of fallout particles and the effectiveness of shielding factors, are among the factors which greatly influence the extent of fallout fatalities and radiation sickness. A factor of two or more of uncertainty in any of the variables mentioned is not uncommon, and consequently large variations in civilian damage are possible.

The computations were based on the key assumptions that 1 KT/mi^2 of fission corresponds to 2,400 roentgens/hour at one hour after detonation (infinite-plane dose), that a modified random drop technique, incorporating the influence of average winds, is a reasonable approximation of the fallout phenonema, and, most importantly, that fallout protection programs are effective and can be implemented. As an example of the importance of a fallout protection program, consider the U.S. damage under a Soviet first-strike in 1965. As previously shown, 45 million casualities would occur under median assumptions in a Soviet attack on military targets only.

In the absence of a civil defense program, casualties could number 100 million. Soviet casualties under a U.S. retaliatory military attack would also be radically increased in the absence of a civil defense program, varying between 60 and 80 million for the two U.S. forces.

The effects of variations in the operational factors and force levels are shown in the following tables. The assumptions concerning civil defense and all factors other than operational factors and force levels are those used in the table on pages 17 and 18. In principle, U.S. and European casualties should vary with variations in U.S. force levels. However, for a reasonably well executed Soviet first-strike, and for the force levels considered (Force I and Force II), the differences in casualties (including fatalities) are negligible and therefore not shown.

SUMMARY OF NATO DAMAGE UNDER A SOVIET STRIKE -- 1968

	United States				Western Europe			
	Casualties		Industry		Casualties		Industry	
	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
	(# in Mils)		(Per Cent)		(# in Mils)		(Per Cent)	
Soviet First-Strike On								
Mil. & Urb.-Indl.Targs.	90	135	50	65	100	130	N/A	N/A
Mil. Targets Only	25	55	8	15	12	15	N/A	N/A

SUMMARY OF SOVIET DAMAGE UNDER A U.S. RETALIATORY STRIKE -- 1968

	Soviet Union							
	Casualties				Industry			
	Force I		Force II		Force I		Force II	
	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.	Opt.	Pess.
	(# in Millions)				(Per Cent)			
U.S. Retaliatory Strike On								
Mil. & Urb.-Indl.Targs.	115	70	120	80	57	30	63	35
Mil. Targets Only	35	20	45	25	11	5	17	7