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ASSISTANT SECRETARY OF DEFENSE
WASHINGTON 25, D.C.

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MEMORANDUM FOR THE SECRETARY OF DEFENSE

SUBJECT: Review of the Hickey Study (U)

Attached is a review of the Hickey Study prepared by the staff of my Programming Office. The Hickey Study is a useful analysis. I think that its most valuable contribution lies in its attempt to flesh out in terms of specific weapon systems the kind of posture we should like to have in the early 1970's if we were to attempt fully to implement a posture suitable for controlled response and a very effective second-strike counterforce. It attempts to clarify the kinds of developments that we should be examining now. As such, I am sure that it merits and that it will receive careful consideration by ODDR&E.

However, I think it important that I emphasize several of the limitations on the Hickey conclusions brought out in the attached review.

First, the statement "a manned reconnaissance-strike vehicle capable of penetrating enemy territory to report the results of U. S. attacks, and to locate and destroy previously unknown or missed targets, is a requirement for implementation of controlled response", is demonstrably untrue. Admittedly, such a capability would be useful to have, but the vast majority of the benefits of a controlled response strategy can be achieved without it. Strike reconnaissance is just one additional way of gaining useful information. There are others. The preferred mix is a question of cost and effectiveness.

depends how "requirement" is defined

what, who, how much

Second, the specifications for the RS-X are not those of the B-70. It is not clear to me that the former is feasible in the time period stipulated. The study does not show that the latter (the B-70) would be justified on a cost/effectiveness basis; the question is simply not considered.

Third, the requirements for a controlled response strategy are exaggerated in the Hickey Study, and its feasibility is under-estimated.

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I see no reason why we cannot have a satisfactory posture for a controlled response strategy by 1964 if not sooner. I reject the suggestion implicit in the Hickey Study that all of these advanced capabilities must be achieved before it makes sense to abandon the spasm war concept.

Fourth, the requirements for Advanced Minuteman are calculated on the assumption that we want a capability to dig up Soviet hard and dispersed ICBMs. This race may not be worth the prize.

Fifth, there is nothing in the Hickey Study which effectively argues for a change in the decisions you have already made for FY 1963 procurement.

Attachment

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SUBJECT: An Evaluation of A Study of Requirements for U. S. Strategic Systems, (Final Report), Net Evaluation Subcommittee, National Security Council

The Purpose and Conclusions of the Hickey Study

The study of the requirements for U. S. strategic systems was directed toward an analysis of alternative military strategic objectives, alternative force postures and their performance in thermonuclear war for the 1962-1971 period. Of the four basic objectives of U. S. general war policy, as set forth in the Proposed Policy Directive, Military Elements of National Security Policy, the study considered two: (1) the reduction of enemy military capabilities and the retention of effective reserves, and (2) precluding U. S. military inferiority. These are basic elements of a controlled response strategy. The objectives of war termination or favorable terms and limiting damage to both the United States and its Allies were considered beyond the scope of the Study.

The study concludes that the controlled response strategy cannot be implemented until the latter part of this decade. This conclusion is based on the argument that basic capabilities will be lacking during the early part of this decade. Among these are:

(a) highly effective strategic weapon systems;

(b) a viable national political-military command and control;

(c) effective intelligence;

(d) timely damage assessment; and,

(e) measures assuring the survival of our Nation.

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An analysis of the last four of these capabilities was beyond the scope of the Hickey Study. While it is certainly correct that effective capabilities in these areas are desirable, moderate degrees of effectiveness in any one of these areas should not seriously degrade the effectiveness of a controlled response strategy. Measures currently being implemented do, in fact, contribute significantly toward correcting the shortcomings in these capabilities.

We will demonstrate, using the framework of the Hickey Study that, as far as force requirements are concerned, controlled response strategy is feasible even for the mid-1963 period.

The Hickey Study recommends five additional advanced weapon systems for the 1971 U. S. objective force: Advanced Minuteman, Polaris A-4, Advanced Titan II, Supersonic Low-Altitude Penetrators Launched by Standoff Missile Launching Aircraft (SMLA/SLAP), and a reconnaissance strike aircraft. These weapon systems can contribute to an effective controlled response during the latter part of this decade by enhancing our withholding capability, allowing intra-war damage assessment, attacking unknown or missed targets of military worth, and negating the effectiveness of potential Soviet anti-missile defense. We have reservations concerning two of these weapons systems; the Advanced Titan II and the reconnaissance-strike aircraft. These will be discussed later.

The study concludes that the ability of strategic forces to respond to nuclear attacks can be made less dependent on early warning. This is correct. But it would, indeed, be a comfortable world if we could be assured that, under a no-warning attack, approximately

Not so- We can Assumption to hold down force reqts

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50 per cent of an alert bomber force would always survive. This is a finding of the Hickey Study.

While the methodology used (and recommended) in the Hickey Study is adequate for future requirements studies, the studies should be further supported by analysis of the performance of the proposed strategic posture stressing the dynamics of general war (force survival throughout the war, bargaining capabilities throughout the war, and the computation of mortalities and industrial damage, on both sides, at various stages of a general war).

Same can be said depends on assumptions

The Requirement for Strategic Reserves

The Policy Directive relative to reserves states that there shall be, ". . . flexible, uncomitted, ready reserve nuclear striking forces capable of enduring in a wartime environment under prolonged reattack while remaining responsive to central control". Under a controlled response strategy, strategic reserves contribute to:

(a) enhancing intra-war bargaining power and military superiority;

(b) deterring wanton wartime attacks against U. S. cities;

(c) controlling a general war and strengthening prospects for war termination on favorable terms by having an option to selectively attack urban-industrial targets even during the later stages of a war;

(d) attacking targets selectively in the Soviet satellites; and,

(e) deterring other potential enemies during the course of a war.

Enthusiasm for war-fighting & want to have worked w/ Hickey & its kind to see how policy was understood

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The Hickey Study relates the size of the reserves to the number of military targets in the Soviet Union (an additional force capable of covering 25 per cent of the Soviet targets associated with their strategic delivery capability) though it is recognized that these reserve forces may have other roles. This is their interpretation of the requirement for a strategic reserve stipulated in the Policy Directive. This does not necessarily correspond to what the framers of the Directive had in mind. The force requirements for potential attacks against Soviet and Chinese urban areas are not shown as reserve requirements--in effect, there is an implied automaticity of attack against these targets (in 1967, for example, Chinese cities are still targeted with B-52 bombers). A characteristic of withheld forces is the ability to survive, not only initial strikes, but also follow-on strikes. No degradation of the reserve force resulting from potential follow-on bomber attacks is recognized in the Hickey Study.

The Feasibility of A Controlled Response Strategy In The Early 1960's

Using the Soviet attack strategy and parameters and the U. S. force operational factors as developed in the Hickey Study, we will show that a controlled response strategy is feasible in mid-1963 as far as force requirements are concerned. We will consider a relatively unfavorable case--that of a Soviet strike giving us "insufficient warning".

The 1963 Hickey target list consists of:

14 Staging Bases

43 Home Bases

67 IRBM/MRBM Sites

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79 ICBM Soft Sites

81 Air Defense Bases

123 Other Air Bases

67 Nuclear Storage Sites

17 Submarine Bases

6 Hardened Military and Government Control Centers

111/180 Urban Areas/DGZ

In addition, Chinese targets add:

25 Bomber Bases

28/46 Urban Areas DGZ

We will use a slightly reduced target list. An examination of Volume II, Annex F, Appendix I, indicates that Soviet nuclear storage sites are heavily co-located with Soviet airfields.[1] The DZG of these sites should be offset to maximize the destruction of both the site and associated airfield.[2] It is also possible to reduce the number of DZG's for the Soviet IRBM/MRBM, ICBM, and air defense targets (but it is not our purpose to reduce the Hickey list to the minimum number of DGZ's). The reduced target list does not include hardened military and government control centers (because of their location in Soviet cities). Table I summarizes the U. S. force requirements as presented in the Hickey Study, whereas Table II summarizes the requirements consistent with a strategy of controlled response. The military attacks shown in both tables have an equivalent target destructiveness capability.

1/ Of the 67 sites, 4 are located on or near staging bases, 40 on or near home bases, and 14 on or near other airfields. Approximately 85% of these are substantially less than 3 miles from the associated bases. These sites are only moderately hardened. The regional sites seem to exploit terrain features and consequently have a higher degree of invulnerability.

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The weapons assigned to USSR urban areas under the Hickey requirements are sufficient to inflict significant damage to 70 per cent of the total floor space in the 111 urban areas (DASA analysis) or approximately 70 per cent significant damage to specified industrial categories (AFIC analysis). To achieve these damage levels the deficiencies of U. S. forces were shown by the Hickey Study to be a equivalent 166 B-52 alert aircraft.

The analysis, as depicted in Table II, shows no force requirement deficit. But there is an approximately 10-15 per cent degradation in the damage inflicted to urban-industrial areas. We do not feel that this reduction is significant enough to rule out the feasibility of a controlled response strategy for the early sixties. What is more important, the forces available for potential ~~weapon~~ urban-industrial attacks in our analysis are missiles, not bombers.

Implications For A United States First-Strike Capability

The postures recommended by the Hickey Study appear to achieve an assured and flexible second-strike capability. These postures inherently have varying degrees of first-strike capability. Future requirements studies should also analyze the effectiveness of the U. S. posture under a first-strike option. (The Hickey postures appear to have an impressive first-strike capability, especially in the late 1960 period. These postures might well induce the Soviets to correct the imbalance of forces.)

2/ Even if the nuclear sites are not destroyed by the missile attacks, intense local fallout could deny the movement of weapons from these sites. More accurately delivered gravity bombs can destroy the sites in follow-up attacks.

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Soviet Posture and The Strategy of Controlled Response

The Hickey Study states that the developments of high yield megaton warheads and an anti-missile defense system may rule out a U. S. strategy of controlled response in the latter part of the decade.

High yield weapons (greater than 50 MT) do not appear to have significant military value (for example, against a 300 psi target a 90 per cent probability of kill is achieved by using either a 5MT/2000 CEP weapon or a 80 MT/5000 ft. CEP weapon--though collateral mortalities may be significantly affected). More likely the weapons may be develop for psychological propaganda, threats, and blackmail purposes. The development might also indicate that the Soviets are concerned with improved war outcome, relying on these weapons (as part of their reserve) to enhance their wartime bargaining position and to deter our wartime attacks against their cities. The development of an anti-missile defense system can also be explained using the same arguments. It can not be concluded that these developments rule out the feasibility of a U. S. controlled response strategy.

Development of Advanced Weapon Systems

The Characteristics of the advanced weapon systems recommended by the Hickey Study for the 1971 U. S. objective force are:

"a. Minuteman Advanced. A highly-reliable 100,000 lb./solid propellant missile capable of carrying a 3,200 lb. payload 5,500 miles with an ultimate [redacted] Re-entry bodies capable of carrying highly-sophisticated penetration aids. A family of warheads ranging

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in yield from kilotons to 9 megatons. Compatible with Minuteman (H&D) silo, hardened to [redacted] with launch control centers hardened to [redacted] Required availability 1966. Employed primarily against high time-priority targets, hardened nuclear and ICBM sites, and ABM defended targets.

"b. Polaris A-4. A highly-reliable advanced Polaris missile capable of carrying a payload of 1,850 lbs. 2,500 nm, or 1,300 lbs. 3,000 nm with a CEP of [redacted] Re-entry body capable of carrying highly-sophisticated penetration aids. A family of warheads ranging in yield from [redacted] Replaces Polaris A-3 in current and future Polaris submarines. Employed primarily against submarine bases, urban targets, and ABM-defended targets. Major component of Reserve. Required availability 1968.

"c. Titan II (Advanced). A highly-reliable, storable liquid propellant missile capable of carrying a payload of 12,000 lbs. at least 5,500 nm with a CEP of [redacted] Re-entry body capable of carrying highly-sophisticated penetration aids. [redacted] Hardened to 500 psi. Employed primarily against very hard nuclear storage sites and ABM defenses. Some retained in Reserve for very hard targets. Required availability 1968.

"d. Supersonic Low-Altitude Penetrator launched by Standoff Missile Launching Aircraft (SMLA/SLAP). A chemically-fueled missile with a range of 2,300 nm (1,400 nm high, 900 nm below 1,000 feet), a speed approaching Mach 4, a CEP of 1,000 feet, and warhead yield in

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the kiloton range. Designed primarily to destroy ABM control centers. Eight missiles carried in an airborne alert mode by aircraft with 40-hour endurance. Required availability 1968.

"e. Reconnaissance Strike Aircraft (R/S-X). An aircraft with minimum charactdristics of Mach 3.5 at 100,000 feet operating altitude. Armed with 18 glide missiles having a CEP of 200 feet and a yield of 20-400 kilotons. Equipped with long-range, high resolution, side-looking radar and other sensors. Designed to provide damage assessment data over enemy or US territory, to locate and destroy targets not previously destroyed, and to serve as a command and control link. This aircraft is widely dispersed and accompanied by a tanker. Required availability 1967."

In the Hickey Study the Minuteman (advanced version) weapon system represents the primary element of the 1971 objective force. Its 5.5 MT warhead (without testing) and 1,800 ft. CEP would result in a .95 single shot kill probability (excluding reliability) against Soviet missile sites hardened to 300 psi. Its capability to carry penetration aids would contribute toward the degradation of a Soviet anti-missile defense system. The study states that the missile is compatible with the silos of the Minuteman (H&D) system, and yet can be hardened to withstand [redacted] The feasibility of utilizing these silos should be demonstrated.

We agree that there is a requirement for an Advanced Minuteman system which can effectively penetrate Soviet anti-missile defenses.

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We disagree with the Minuteman force size recommended in the Hickey Study. It is not at all clear that the capability to destroy all known Soviet hardened and dispersed missile sites is a reasonable objective considering both cost and effectiveness, and especially considering possible Soviet active missile defenses.

Polaris-4 missiles represent a logical follow-on to earlier versions. The force size should be consistent with the required damage potential against Sino-Soviet Bloc industrial structure, and should represent the major element of the strategic reserve.

The rationale for the Advanced Titan II system depends on the requirement for a very high yield weapon [redacted] Based on military considerations, the need for this system is not apparent. The Hickey Study indicates that Titan II would be able to deliver a [redacted] and is competitive with the advanced version.

A supersonic low altitude penetrator (SLAP) could be an effective counter to an anti-missile defense system, and this proposal deserves careful consideration. The long endurance stand-off missile launching aircraft (SMLA) would have the flexibility not only to serve as a platform for the SLAP, but also to serve as a platform for air-to-air missiles defending CONUS against Soviet follow-on bomber strikes, a command communication relay, a damage assessment platform, and perhaps as a reconnaissance-strike vehicle. The suitability of this aircraft for these various roles should be examined.

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The value of continuation of the B-70 program as a reconnaissance-strike system for the late 1960 period is questionable. Unless it can be demonstrated that the requirements for a reconnaissance-strike system can best be satisfied by a Mach 3.5 vehicle, a requirement for this weapon system should be deferred. Nowhere in the Hickey Study is there an analysis of the cost and effectiveness of this aircraft. 3/ Many studies have demonstrated the difficulty of searching for unknown targets (the human/equipment interactions) at speeds far less than Mach 3.5.

While it is certainly correct that a reconnaissance-strike capability would enhance our ability to attrite enemy forces throughout a war, it does not follow that a lack of an effective system would negate the utility of a controlled response strategy.

It should be realized that a controlled response strategy is not a "go-no-go" proposition. Even a moderate degree of effectiveness can contribute significantly in improving the position of the United States in a possible general war.

3/ Paradoxically, should not the potential effectiveness of reconnaissance-strike reduce the requirement for reserve missiles (since the reserve requirement was specified in the Hickey Study as additional soft and hard target coverage)?

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TABLE I [a/]

Hickey Force Requirements 1963

TARGETS	1963 - NO WARNING		
	No. Targets	Weapon	Number
USSR			
Staging Bases	14	Atlas E	28
Home Bases	43	Minuteman	86
IRBM/MRBM	67	Titan I	16
		Atlas F	74
		Polaris 2	36
		B-52 (AA-4)	12/48
		B-52 (GA-4)	106/424
ABM Defense/DGZ	--	--	--
Air Defense A/F	81	Titan I	38
		Polaris 1	48
		Polaris 2	12
		Minuteman	64
Other A/F	123	B-47 (GA-4)	123/492
SAM	--	GAM-77	366
Nuc Storage Sites	67	Titan II	18
		B-47 (GA-1)	148/148
		B-52 (GA-2)	112/224
Submarine Bases	17	B-52 (GA-4)	30/120
Hardened Mil&Gov Cont	6	B-52 (GA-2)	21/42
Urban Areas/DGZ	11/180	B-58 (GA-1)	26/26
		B-52 (GA-4)	135/540
		B-47 (GA-4)	25/100
		Polaris 2	16

a/ Explanatory Notes follow the table.

Attachment I

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TABLE I
(Continued)

Hickey Force Requirements 1963

TARGETS	1963 - NO WARNING		
	No. Targets	Weapon	Number
CHINA			
IRBM	--	--	--
ICBM	--	--	--
Bomber Bases	25	B-52 (GA-4)	29/116
SAM	--	--	--
Urban Areas/DGZ	28/46	B-52 (GA-4)	31/124

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TABLE I
(Continued)

Hickey Force Requirements 1963

RESERVE

Targets	Weapon System	Number
Hard 17	None available	
Soft 86	Polaris 2	16
	Deficit	125

FORCE REQUIREMENTS

System	Committed Alert	Reserve Forces	Required for Support or U.E.	Total Budget Forces
Atlas D	-	-	-	30
Atlas E	28	-	2	30
Atlas F	74	-	4	78
Titan I	54	-	6	60
Titan II	18	-	2	20
MinMan (H&D)	150	-	-	150
Polaris/SSBN	112(7)	16(1)	64(4)	192(12)
GAM-77	366	-	306	672
B-52	310	-	275	585
B-52 Deficit	-166	-	-147	-313
B-47	296	-	289	585
B-58	26	-	54	80

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TABLE I

EXPLANATORY NOTES

FORCE REQUIREMENTS - 1963

1. Weapons systems requirements are displayed for the conditions of "No Warning".

2. The display is explained as follows:

a. "Targets" columns - the category and number of DGZ's. Where two numbers are shown the first represents the number of target areas and the second, DGZ's.

b. The "Weapon" column indicates the weapon system(s) selected for each target category. Popular names and model thereof are used for surface-to-surface missiles; thus, "Minuteman"--the first model; Polaris 2--the second generation Polaris, etc. Aircraft Service designations followed by a parenthetical expression indicate posture and loading, e.g. (AA-4) air alert with four gravity bombs, (GA-4) ground alert with four gravity bombs.

c. The "Number" column displays the number of alert weapons and, where necessary, weapon carriers required to achieve the desired target damage.

d. Reserve. The reserve summary indicates the numbers and types of alert weapons systems required to meet the reserve force criteria established in this study. Where systems are not available deficits are shown.

e. Force Requirements Summary is a compilation of each system employed. Column 1 shows the systems used. Column 2 shows the alert vehicles committed to the attack. Column 3 shows the reserve forces utilized. Column 4 shows the non-alert forces required to support the committed alert forces. In some cases it also includes the small number required (plus or minus) to fill the U.E. for a whole organizational unit (e.g. wing, squadron, etc.) since budget estimates are calculated on this basis. Column 5 shows the total forces used as a basis for budgetary computations.

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TABLE II

Force Requirements - Controlled Response - 1963

TARGETS	1963 - NO WARNING		
	No. Targets	Weapon	Number
USSR			
Staging Bases (4 Nuclear Sites)	14	Atlas F	4
		Titan II	4
		Minuteman	20
Home Bases (40 Nuclear Sites)	43	Atlas F	40
		Titan I	40
		Minuteman	6
		B-47 (GA-1)	148/148
IREM/MREM	67	B-58 (GA-1)	26/26
		B-52 (GA-2)	105/210
ICBM (soft)	79	Atlas E	10
		Minuteman	69
		B-52 (AA-4)	12/48
		B-52 (GA-4)	53/212
Air Defense A/F	81	GAM-77	300
		B-52 (GA-4)	52/104
Other A/F (14 Nuclear Sites	123	Titan I	14
		Titan II	14
		B-47 (GA-4)	123/492
SAM	--	GAM-77	66

Attachment II

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TABLE II
(Continued)

Force Requirements - Controlled Response - 1963

TARGETS	1963 - NO WARNING		
	No. Targets	Weapon	Number
Nuc Storage Sites	9	Atlas E	18
Submarine Bases	17	Minuteman	17
		B-52 (GA-2)	23/46
		B-52 (GA-4)	5/20
Co-located Nuc Sites[a/]	18	B-47 (GA-4)	25/100
CHINA			
Bomber Bases	25	B-52 (GA-4)	29/116
RESERVE			
USSR Urban Areas/DGZ	111/180	Atlas F	30
		Minuteman	38
		Polaris I and II	128
China Urban Areas/DGZ	28/46	B-52 (GA-4)	31/128
Unspecified		B-47 (FO-1)	43/43
		B-58 (FO-1)	8/8
		B-52 (FO-2)	41/82

a/ Associated with staging bases and other A/F bases.

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