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NET EVALUATION SUBCOMMITTEE

NATIONAL SECURITY COUNCIL

APPRAISAL OF RELATIVE MERITS, FROM THE POINT OF VIEW OF EFFECTIVE DETERRENCE, OF ALTERNATIVE RETALIATORY EFFORTS (U)

30 October 1959

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OF THE

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I. INTRODUCTION

A. THE PROBLEM

1. This study is in response to National Security Council (NSC) Action 2009 by which the President directed an appraisal of alternative retaliatory efforts. Pursuant to this directive the problem (Annex A) as stated to the Director, Net Evaluation Subcommittee (NESC) Staff was:

"In order to establish the relative merits, from the point of view of effective deterrence, of alternative retaliatory efforts directed toward: (a) primarily a Military Target System; (b) primarily an Urban-Industrial Target System; or (c) an Optimum-Mix of combined Military/Urban-Industrial Target System; determine:

a. "The minimum number of enemy targets by category which the United States retaliatory forces must be clearly capable of destroying or neutralizing in order to achieve the objective of prevailing in general war.

b. "The U.S. retaliatory forces required to neutralize or destroy the targets determined in a. above, and

c. "The adequacy of the required retaliatory forces to contribute effectively to the national objective of deterrence."

2. The Terms of Reference required that the study be made under two conditions with respect to warning time:

a. "Under conditions of tactical warning only, initial surprise attack by the USSR would occur. With few exceptions the warning of enemy surprise attack at the operational level of command would not be less than 15 minutes.

b. "Under conditions of strategic warning, a minimum of 24 hours' warning time will be available, although no more than 15 minutes' tactical warning can be expected."

B. DEFINITIONS

1. "Retaliatory forces" are defined as follows: Strategic bombers (heavy and medium) used as bomb carriers and as launching platforms for air-to-surface strategic missiles, intercontinental ballistic missiles, intercontinental cruise missiles, intermediate range ballistic missiles, fleet ballistic missiles, and naval heavy attack aircraft.

2. The term "prevailing in general war," is defined as that state which exists when one nation (or group of nations) has destroyed the will or ability of another nation (or group of nations) to successfully pursue its general war objective, while at the same time retaining a significant military force, and viable political and economic national structure, capable of achieving its objectives in general war and of controlling its own destiny.

3. The term "deterrence" is defined as that state which exists when the military strength and retaliatory threat of one opponent is recognized and accepted by the other as sufficient to preclude the initiation of general war as a means of attaining national objectives.

4. A general war will consist of two phases, namely:

a. An initial phase of comparatively short duration characterized by an intensive exchange of atomic blows and the initiation of operations and deployments by Army, Naval and Air Force forces designed to achieve strategic advantage. During this period, the U.S. atomic capability would be exploited fully, to the end that enemy military losses and the loss of the war-making capacity directly supporting enemy forces would be such as to either (a) bring about his capitulation or (b) provide a margin of relative advantage to the United States and its Allies sufficient to assure victory in the subsequent phase of operations.

b. A subsequent phase, of indeterminate duration, which would be a continuation of initial phase operations, probably at reduced atomic intensity, and follow-up offensive operations designed to achieve victory and attain Allied war objectives.

5. Damage criteria used in this study are as set forth by the Defense Atomic Support Agency (DASA) in the Tentative Joint Atomic Weapons Planning Manual.1/

a. Severe Damage. A damage level which essentially requires complete replacement or reconstruction of the target.

b. Lesser but Significant Damage. Here the target is considered in isolation and not in association with other targets or the population. In general, this damage level approaches the lowest predictable which guarantees, beyond conjecture, that regardless of orientation the target will be rendered inoperable or unusable for a significant time period (30 days).

6. A military target is a key governmental or military control, an element of the Armed Forces, or facility or resource capable of providing immediate and direct support to military operations.

7. An urban-industrial target is one containing an industrial resource or economic control essential to the over-all economy of the nation.

C. OBJECTIVES

In the event of general war, the objectives2/ of the United States are:

"1. To prevail, and survive as a nation capable of controlling its own destiny.

1/ For detailed damage criteria as related to specific target categories see reference u.
2/ Reference a.

2. To reduce, by military and other measures, the capabilities of the USSR and Communist China to the point where they have lost their will and ability to wage war against the United States and its Allies

3. To render ineffective the control structure by which the enemy regimes have been able to exert ideological and disciplinary authority over their own peoples and over individual citizens or groups of citizens in other countries.

4. To preserve and retain as many of our Allies as possible.

5. So far as consistent with the above objectives, to avoid destruction and casualties in all countries not involved in the war.

6. To retain in the United States a capacity for quick recovery from nuclear assault."

In developing the solution to the problem as stated, we have sought to attain these objectives insofar as they apply to the "retaliatory forces" in the first strategic strikes of the "initial phase." Whether the U.S. prevails in general war, and achieves all objectives, is not a function of these forces alone or of the initial phase alone, but involves many actions and events outside the scope of this study. The National Policy implies that we must be prepared to accept the initial nuclear attacks of the USSR and thereafter retaliate with sufficient weight of attack against the enemy military, political and economic structures as to assure an ultimate victory. Implicit in this philosophy is the dependence on defensive and offensive elements of our forces to hold the damage to the United States and its Allies to an acceptable level; the assurance that our Allies will support us in a common endeavor; the reliance on ground, air and naval forces to successfully achieve their initial tactical objectives; and the ability of the United States and its Allies

to regroup residual forces and pursue the war to a successful conclusion. With respect to these collateral actions and events, it is necessary to adopt the following assumptions, in order to place this study within its proper perspective and render the answers usable.

D. ASSUMPTIONS

1. That the Sino-Soviet Bloc will initiate general war in 1963.

2. That the security policy of the United States will continue to be dependent to a marked degree upon a structure of alliances between the United States and other Free World nations.

3. That forces and weapons available to theater commanders for "other military operations" will be at such strength and state of readiness as to permit the accomplishment of priority initial phase undertakings (JCS 1844/252) in the European and Far Eastern theaters.

4. That the Air Defense and Anti-Submarine Forces of the United States will be capable of containing the Soviet attack on the continental United States (CONUS) to the extent that the United States will survive as a viable nation capable of continuing the offensive on a world-wide scale.

5. That Soviet Forces in 1963 would be as indicated in the Coordinated Intelligence Assumptions, 15 May 1959, as prepared by the United States Intelligence Board (USIB).

E. REFERENCES

1. The following documents and briefings were utilized by the Staff as guidance or reference material in the development of target systems.

a. NSC 5904/1 - National Objectives in General War.

b. NSC 5906/1 - Basic National Security Policy.

c. JCS 1844/243 and 252 - Joint Strategic Capabilities Plan, 1958.

d. Target Lists and Strategic Targeting Concepts as submitted by Army, Navy and Air Force in response to JCS/SM-228-59 of 25 February 1959.

e. WSEG Report No. 23 (Second Annual Review).

f. JCS 1623/223 - Concept of Employment and Command Structure for the Polaris Weapon System.

g. Target Data Inventory Volumes I and II of June 1959.

h. Naval Ordnance Test Station 1901 - The Vulnerability of Complex Targets to Nuclear Weapons.

i. An Analysis of Certain Weapons Effects on Selected Soviet Bloc Urban Areas - Office of the Chief of Engineers, U.S. Army.

j. A Study of Complex Targets, Moscow, Dayton and Geneva Steel - Rand Corporation, 15 December 1954.

k. Reports of NESC of 1956, 1957, 1958 and 1959.

l. USAF Target Charts Series 100 of Major Soviet and Chinese Complexes.

m. "Urban Blast Damage, Weapon Yields and Delivery Accuracies" - Rand Corporation, 15 July 1957.

n. "The Effects of Delivery Accuracy and Weapon Yield on the Expected Damage to Urban Complexes" - Deputy Director for Targets, USAF, 22 April 1954.

o. "Vulnerabilities of Primary Naval Interest Within the Sino-Soviet Bloc." - ONI 52-8A of 30 July 1958.

p. Current National Intelligence Estimates.

q. Current National Intelligence Surveys (USSR and China).

r. Coordinated Intelligence Assumptions for NESC Project, 1959 - USIB, 15 May 1959.

s. Nuclear Weapons Employment Handbook - AFM 200-8.

t. Control Center Planning Charts, Projection 1:3, 149,361 - USAF.

u. Tentative Joint Atomic Weapons Planning Manual (Service approved criteria).

v. Memo from USAF of 19 August 1959 - "Ballistic Missile Accuracy."

w. CNO letter ser 00300P60 of 24 July 1959 - "Polaris Capabilities."

x. Memorandum from Chairman, JCS to Lieutenant General T. F. Hickey, USA, of 20 February 1959, with enclosure (see Annex A).

y. Memo from USAF of 12 January and 8 October 1959, "U.S. Force Structure (SAC)."

II. SUMMARY AND CONCLUSIONS

A. GENERAL. This study is in response to NSC Action 2009 by which the President directed an "Appraisal of the Relative Merits, from the Point of View of Effective Deterrence, of Alternative Retaliatory Efforts." Responsibility for the study was assigned to the NESC Staff by memorandum from the Chairman, Joint Chiefs of Staff of 20 February 1959, attaching broad Terms of Reference as guidance (Annex A). These Terms of Reference provided a step procedure which was followed in the development of the target systems, weapons and forces. Each step was completed before the succeeding step was initiated.

1. Military, Urban-Industrial, and Optimum-Mix Target Lists were developed.

2. Criteria for desired weapon effects and probabilities of success against which to measure destruction or neutralization of targets were formulated.

3. Desired ground zeros and weapons by yield and type of burst were selected for each target system and damage estimates were calculated by the Defense Atomic Support Agency (DASA) based thereon.

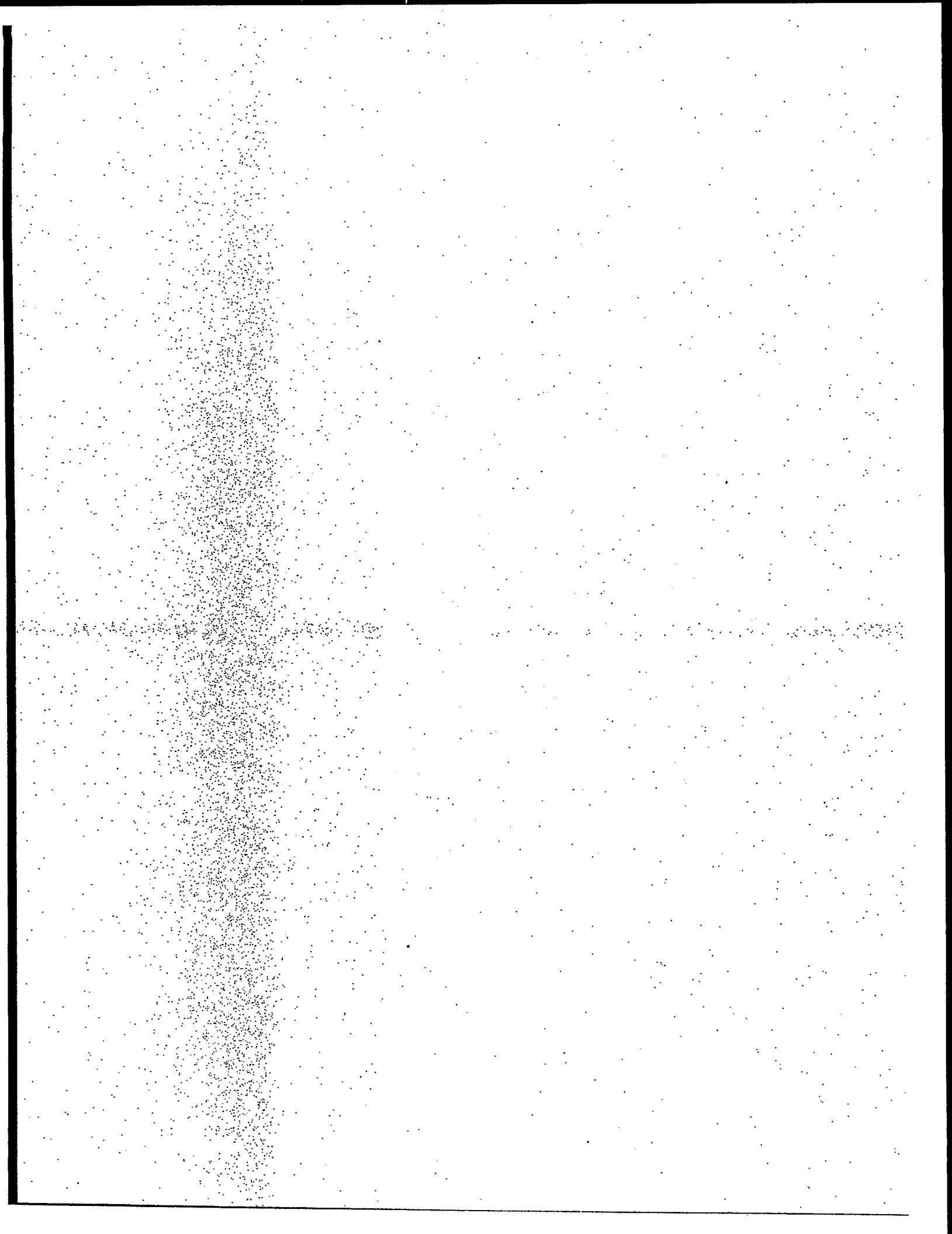
4. Reevaluation and adjustment of target lists.

5. Numerical values for operational factors were developed and applied to determine the forces required for the delivery of weapons on each target system.

6. The forces developed for each target system were appraised as to their adequacy as an effective deterrent to general war.

7. Conclusions and recommendations were drawn.

The definition of "Retaliatory Forces" as set forth in the Terms of Reference, limited the scope of forces to be developed to those aircraft and missiles capable of



(25)(x5)

ALERT - 24 HOUR
WITH 15 MINUTE TACTICAL WARNING

(Programmed Aircraft)	Aircraft Required	(Programmed Missiles - 1963)	
[redacted]	B-52 - [redacted]	Atlas -	[redacted]
	B-47 -	Titan -	
	B-58 -	Minuteman -	
		Polaris -	

The force requirement for the surprise assumption exceeds the bomber aircraft programmed for 1963. Acceptance of a 75 per cent assurance of weapon delivery on each target would reduce the requirement to 970 aircraft, or well within the forces programmed for 1963. Damage estimates by DASA based on the appropriate weapon at each BRL indicate that total casualties in the USSR would approximate 73.7 million or 36 per cent of the population, of which 44 million would be urban casualties. Casualties in China are estimated at 108 million, or 18 per cent of the population. In addition, virtually all bases and facilities of long-range nuclear capable forces, primary military control centers and selected government control centers were estimated to be destroyed or neutralized and the war supporting industrial base severely disrupted.

C. THE URBAN-INDUSTRIAL TARGET SYSTEM. The targets in this system consisted of urban-industrial complexes in the USSR and China containing government controls, significant production percentages of vital war resources or which were key transportation centers. The staff selected a group of basic and end-item industries considered essential to the war effort and searched the TDI for cities containing significant percentages of these industries. Cities containing primary and secondary government controls were added to the list of cities

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selected. In the USSR, 122 cities and in China, 27 cities were ultimately selected as targets. No military forces or bases were deliberately targeted. DGZ's and weapons were selected first on the basis of lesser but significant damage to war resource categories, and secondly on the basis of severe damage to 50 per cent of the industrial floor space in each complex.

(25)(x5), (6.2)(a)

[redacted]

Forces required for 90 per cent assurance of delivery of weapons on each TDI target are:

(25)(x5)

	(Programmed Aircraft)	Surprise (Required)	Alert
	[redacted]	B-52 - [redacted]	[redacted]
		B-47 -	
		B-58 -	

Forces required for 90 per cent assurance of delivery of missiles on each target are:

(25)(x5)

		Surprise	Alert	(Programmed Missiles)
Atlas,	[redacted]	[redacted]	[redacted]	[redacted]
Atlas,				
Titan,				
Titan,				
Minuteman				
Polaris				

Damage estimates by DASA based on the appropriate weapon at each BRL indicate that the aircraft attack on TDI targets would essentially destroy the basic war-supporting economies of the USSR and China, cause 81.8 million casualties (40 per cent of total population, 60 per cent of urban population) in the USSR and 81.7 million (13.6 per cent) casualties in China.

Damage to the hard targets of the war-supporting economy from missile attack would be substantially less because of the floor space criteria, but would cause an estimated 61.5 million casualties in the USSR (30 per cent of total population, 50 per cent of urban population) and 56.4 million (10 per cent) in China.

D. THE OPTIMUM-MIX TARGET SYSTEM. This system is an amalgamation of the type targets listed in the Joint Strategic Capabilities Plan for priority initial phase undertakings and alternative undertakings. Ultimately selected from the Military Target System and from the Urban-Industrial Target System to comprise the Optimum-Mix System, were [redacted] DGZ's and weapons were computed by DASA on the basis of 90 per cent assurance of:

(25)(x5)

1. Severe damage to targets containing nuclear delivery forces or weapons, primary military and government controls;

2. Lesser but significant damage to key transportation targets, military logistic targets, and non-military airfields;

3. Severe damage to 50 per cent industrial floor space in each urban-industrial complex.

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(25)(x5), (6.2)(a)

[redacted]

Forces required for 90 per cent assurance of delivery of weapons on each target are as follows:

AIRCRAFT ONLY

(25)(x5)

(Programmed Aircraft)	Surprise (Required)	Alert (Required)
[redacted]	B-52 [redacted]	B-52 [redacted]
	B-47	B-47
	B-58	B-58

COMBINATION AIRCRAFT - MISSILES

Aircraft

(Programmed Aircraft)	Surprise (Required)	Alert (Required)
[redacted]	B-52 [redacted]	B-52 [redacted]
	B-47	B-47
	B-58	B-58

(25)(x5)

Missiles (Programmed for 1963)

Atlas	[redacted]	- [redacted]
Atlas		-
Titan		-
Titan		-
Minuteman		-
Polaris		-

Missile Only

[redacted]

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Aircraft required for this system under the surprise condition exceed those programmed for 1963. Acceptance of a 75 per cent assurance of delivery on each target would reduce the requirement to [redacted]

(25)(x5)

Damage estimates by DASA based on the appropriate weapon at each BRL indicate 81 million casualties (39 per cent of toal population) in the USSR of which 57 million would be urban casualties (58 per cent of urban population). It was estimated that China would suffer 117 million casualties or 20 per cent of total population. It was further estimated that virtually all bases and facilities of the long-range nuclear delivery forces, primary military control centers, and primary and secondary government controls would be destroyed or neutralized, and that the war-supporting economy would be paralyzed for an indefinite period.

E. DISCUSSION

1. Relative Merits of Target Systems

a. Military Target System. It is estimated that the successful attack of this target system would substantially destroy or neutralize the enemy nuclear delivery capability, retard the movement of land, sea and air forces in the USSR and China, substantially destroy primary military controls and those government controls of primary military importance, cause casualties [redacted]

(25)(x5)

and seriously disrupt the economies of the two countries. This target system has the limitation that the war-supporting economies of the USSR and China, while seriously disrupted, would not be damaged to the extent of inability to support the war effort.

b. Urban-Industrial Target System. It is estimated that the successful attack of this target system would indefinitely paralyze the basic war-supporting economies of the USSR and China and cause in excess of 35 per cent casualties in the USSR and 12 per cent in China. This target system has the serious limitation that the military forces, including the Soviet nuclear delivery capability, were not targeted and would therefore remain relatively intact.

c. Optimum-Mix Target System. It is estimated that the successful attack of this target system would substantially destroy or neutralize the enemy nuclear delivery capability, retard the movement of land, sea and air forces in the USSR and China, substantially destroy primary and secondary military and government controls, cause in excess of 35 per cent casualties in the USSR and 15 per cent in China, and indefinitely paralyze the war-supporting economies of both countries. No major limitations are evident.

2. Terms of Reference. The Terms of Reference which provided guidance for the conduct of this study included, by statement or by implication, certain assumptions which may or may not be valid.

a. Warning. The directive specified that force structures were to be developed under the alternative assumptions of a surprise attack with a minimum of 15 minutes' tactical warning at the operational level, and an attack preceded by strategic warning of 24 hours. In either case, a minimum of 15 minutes' tactical warning at the operational level, including the decision to launch retaliatory forces, is requisite to successful retaliation. The unproven effectiveness of warning systems, the potential threat of

ICBM and submarine-launched missiles, and the inherent delay in the decision-making process, leave considerable doubt that 15 minutes of effective warning will be available at the operational level.

b. "Prevail." The Terms of Reference directed the development of alternative target lists each consisting of a minimum number of targets by category which retaliatory forces must be clearly capable of destroying or neutralizing, in conjunction with other specified military operations, in order to achieve the objective of prevailing in general war. Thus, by implication, it has been assumed that the destruction of some ultimate number of "primarily military" or "primarily urban-industrial" targets will satisfy the conditions for prevailing. Within the context of our understanding of the terms "primarily military" and "primarily urban-industrial" it is doubtful that the destruction or neutralization of such specific target systems would place the United States in a position to assure prevailing.

c. Intelligence. The estimates of Sino-Soviet forces, capabilities, intentions, beliefs and probable courses of action (Annex B) upon which this study is based were developed by the United States Intelligence Board for this purpose. Any material change in the estimated strength of nuclear capable forces from those contained in this estimate will result in a change in the number of targets. These changes, in turn, will alter the force structures of the retaliatory forces as set forth in this study.

d. Other Forces. For purposes of this study the assumption has been made that forces other than "retaliatory forces" will have the strength, weapons, capability and state of readiness required to carry out their assigned missions in general war. There is no assurance that this status will be achieved in 1963. In particular it does not

appear that the air defense and anti-submarine forces will be capable of containing a heavy Soviet attack on the United States to the extent that the nation will be assuredly capable of continuing an offensive on a world-wide scale following such attack. Past studies indicate that a properly targeted attack in the range of 2,500-3,000 megatons detonated on this country would make survival as a viable nation marginal. In 1963 the USSR is estimated to be capable of delivering 1,000 to 3,000 megatons on the United States by ICBM and submarine-launched missiles alone. No active defense against ballistic missiles is programmed to become operational by 1963.

e. Operational Factors. The Terms of Reference required the development and application of specific operational factors to determine force structures. The validity of these factors is fundamental to a sound solution. Factors such as In Commission Rate, Reliability Rate and Abort Rate for aircraft are based on experience in training. Weapons per Carrier Rate is based upon average carrier capability. Enemy Defense Suppression Rate is the percentage of the total weapons scheduled against primary targets (the remaining percentage being scheduled for air defense suppression). Other factors pertain to future equipment, particularly missiles, on which essentially no operational experience exists. The estimated CEP's and operational factors utilized for ICBM and FBM missiles were based on submissions by the responsible Service. These factors appear optimistic, and we are concerned whether the efficiency indicated will be achieved by 1963.

The last category of factors includes Surprise Attack Survival Rate, Enemy Resistance Survival Rate and Restrike Availability Rate. These represent judgments of the staff based on war gaming experience, and were derived from the

mathematical combinations of operational and theoretical factors used in war gaming to aggregate the multiple interplays of combat events which theoretically would occur in actual war. The results obtained in war games are directly related to the assumptions and factors upon which the game is based, and thus could be at substantial variance with those obtained in actual war. Small changes in Surprise Attack Survival Rate and Enemy Resistance Survival Rate from those used in this study would considerably alter the force structures as developed herein.

f. Assurance of Expected Damage. In developing the target lists and the force requirements we have considered two essential probabilities. The first of these relates to the assurance of achieving the desired effects at the target and is a function of the CEP and size of the weapon used. In this study we have used the weapons with the characteristics necessary to provide 90 per cent assurance of the desired effects, and resultant over-all damage is estimated to be in excess of 90 per cent. The second probability, that of delivering the weapon to the appropriate BRL is a function of the over-all effectiveness of any given delivery system. In this case we felt it appropriate to show a range of required forces; those to provide a 90 per cent assurance and a 75 per cent assurance, the latter resulting in a commensurate reduction in the over-all damage to be expected.

g. The Trend to Missiles. The accuracy and reliability characteristics for the ICBM's and the Polaris missiles in 1963 as provided by the U.S. Air Force and U.S. Navy indicate tremendous progress in the development of these systems. The study indicates a missile capability for attack of soft and area targets substantially in competition with manned aircraft and with far faster

reaction timing. It should be noted, that while the trend is obvious, a weapons delivery system with a proven operational CEP is being compared with missile systems on which operational knowledge is today nonexistent and in 1963 may still be extremely limited. We wish to note also that as we progress into the missile period the flexibility to launch and re-call now inherent in an aircraft force will not be available with missiles.

F. CONCLUSIONS.

The conclusions which follow must be considered in the light of the assumptions and considerations listed in E.2. above, which governed the conduct of this study, and the extent to which these assumptions and considerations are valid for the time period under scrutiny. It is concluded that:

1. In order to prevail, the United States must have the means of greatly reducing the weight of nuclear attack which the USSR will be capable of delivering against this country in 1963.

2. Destruction or neutralization of the Military Target System could place the United States in a position of relative military advantage from which to ultimately prevail. However, this system has the limitation that the war-supporting economy, while seriously disrupted, would not be damaged to the extent of inability to support the war effort.

3. The destruction or neutralization of the Urban-Industrial Target System would paralyze the war-supporting economy of the USSR and China, but would not ensure that the United States would prevail because the enemy military forces, including the nuclear delivery capability, would remain relatively strong.

4. Destruction or neutralization of the Optimum-Mix Target System would place the United States in a position of relative advantage from which to ultimately prevail.

5. The targets developed for the Military and the Optimum-Mix Target Systems are in the range of the minimum essential number which the United States must be clearly capable of destroying or neutralizing in order to achieve the objective of prevailing in general war.

6. The range of retaliatory force structures providing between 90 and 75 per cent assurance as developed for the Optimum-Mix and Military Target Systems under the assumption of surprise attack should provide effective deterrence to general war in 1963.

7. The force structures developed for the Urban-Industrial Target System are inadequate to provide effective deterrence to general war in 1963.

8. As a result of uncertainties which became evident in the preparation of this report, particularly as we enter the missile era, further studies appear to be necessary in the following fields in order to assess their impact on the capabilities of the United States to prevail in general war.

a. The assurance of obtaining strategic warning.

b. The assurance of tactical warning.

(1) For aircraft - a minimum of 15 minutes at the operational level of command.

(2) For missiles - compression of the time element involved in the decision making process to assure launch prior to the arrival of initial enemy missiles.

c. Measures to lessen the vulnerability and improve the survivability of U. S. forces.

d. Measures to improve the strike delivery efficiency of the U.S. retaliatory forces.

e. Capabilities of Theater Forces to accomplish their mission.

f. Capability to contain a nuclear attack on the United States.

G. RECOMMENDATIONS

It is recommended that this report be considered in the determination of a strategic retaliatory force structure for the 1963 time period.

III. VARIABLE CONSIDERATIONS AFFECTING THIS STUDY

A. PREVAILING. The statement of the problem for this study implies the assumption that in 1963 the United States could survive a first nuclear attack and thereafter would retaliate in adequate force with nuclear weapons to place the U.S. in a position of relative advantage from which to achieve the objective of prevailing in general war. This assumption can be valid only if the scale of nuclear attack on the United States can be accepted or neutralized and adequate warning is given to insure the launching of strategic retaliatory forces. As the capability of the USSR for nuclear attack on the United States reaches a level at which the ensuing destruction, regardless of the capability of U.S. defensive and offensive forces, would place the National survival in jeopardy, this assumption becomes most questionable.

Studies[1/] made over several years have indicated that provided adequate warning is received by U.S. forces, a nuclear war, initiated by the Soviets would result in the mutual devastation of both the United States and the USSR.

The National Damage Assessment Center estimates of probable damage and casualties in the United States from assumed nuclear attacks on the order of 2,000 MT to 2,500 MT are gravely serious but have indicated that survival of the Nation might be expected unless further heavy attacks should occur. While no conclusion can be drawn as to the additional weight of attack that the United States might absorb and survive as a viable nation, damage studies do indicate that casualties and damage occurring for weights of attack above 2,500 to 3,000 MT leave survival in great doubt. The damage and casualties resulting from any weight of attack could vary widely,

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1/ Reference k.

depending on the target system attacked, the size of weapons used, the timing of the attack, the number of weapons on target, the total number of weapons detonated and the preparation, quality and use of shelters by the population. Of equal or perhaps greater importance to survival will be the morality, fortitude and will of the population and leadership to continue.

National Intelligence Estimates indicate that by 1963 the USSR is estimated to have an ICBM and submarine-launched missile capability that could result in an initial attack of over 1,000 megatons (assuming five MT warheads for ICBM's) detonating on the United States with potential follow-on strikes in a few hours of at least equivalent weight. The Long Range Air Force is estimated to have 900-1,000 heavy and medium bombers and the Tactical Air Armies and the Naval Air another 600 medium bombers. With this force the USSR has the potential of more than doubling the total missile delivery capability on the United States and our Allies and the possible over-all weight of attack is greater than that at which survival might be doubtful.

Our studies have shown that operational capability, precautions to preserve strategic surprise, and time and space considerations serve to limit the weight of initial attack. Rapid and effective defensive and retaliatory counter force actions can substantially reduce bomber attacks and, to the extent that missile launch sites are known, both missile and bomber "follow-on" and residual capability. As presently programmed, in 1963 it appears that we will have no means of reducing a missile attack except for destroying the force at its source. We must be prepared to accomplish this in order to reduce to a minimum the damage which could occur in the United States.

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B. WARNING AND VULNERABILITY. In the ICBM era survival and retaliation will be critically dependent on adequate warning at the tactical force level and on rapid decision for action.

The assumptions given with the problem provided for not less than 15 minutes' warning of enemy attack at the operational level. It has been assumed that this included the decision to act and the factors with respect to force survival are estimated on this basis.

The Ballistic Missile Early Warning System is now programmed to be fully operational in 1963. If it provides the Strategic Air Command with instantaneous warning of a ballistic missile attack, approximately 15 minutes' warning will be possible at the operational level. If this includes the decision to launch, the ground alert force can be airborne within the 15 minutes. Under these conditions of surprise the survivability of the remainder of the force, which must be readied and loaded, is questionable.

Under the assumption of "full alert" the fifteen minutes' tactical warning is equally critical to survival of the force. Although strategic warning will result in an improved readiness of the force depending on the time available, and will increase the number of aircraft launched in the 15-minute period of tactical warning, it still will not prevent the possible loss on the ground of a sizable portion of the retaliatory force.

The point cannot be made too strongly that survival and prevailing are directly dependent on receiving the maximum amount of warning at the tactical level. As ICBM's become a larger proportion of the retaliatory force, means must be found to insure that the decision to act can be made within the period of tactical warning.

C. OPERATIONAL FACTORS. This study requires the development and use of specific operational factors as criteria for determining force structure. The validity of these factors is fundamental to a sound and realistic solution. The confidence that may be placed on the validity of each of the factors is a function of its derivation. In almost every case the derivation involves a judgment based on data in which we cannot give positive confidence. We consider that the development of the operational factors falls into several categories of validity.

1. In-Commission Rate, Reliability Rate, and Abort Rate for current aircraft may be based on extended operational or training experience and thus are substantially valid in their individual application.

2. Other operational factors represent judgments as to the operational effectiveness based on experience in training (as opposed to actual combat) with the type equipment or with combinations of equipments.

3. Two operational factors--Enemy Defense Suppression Rate and Weapons per Carrier Rate--involve not only the capability of the carrier to carry the weapons but the plans for getting to the targets, i.e., size of weapon required, range to targets, defenses, tactics, and the Commander's judgment as to the number of targets to be attacked. In the case of the Weapons/Carrier Factor, for those aircraft capable of carrying more than one weapon, we have used a factor based upon average carrier capability.

4. The fourth category of factors pertain to future equipment, particularly missiles, on which essentially no operational experience exists. The estimated CEP's and operational factors utilized for ICBM's and the Polaris missile were based on the submissions of the responsible service.

These factors seem optimistic for early models of all these missiles when compared with experience in operational use of other complicated weapons systems. We are concerned as to whether these CEP's and operational factors will actually be attained by 1963. If they are not attained, the numbers of missiles required to perform the tasks indicated would be substantially increased.

5. A fifth category of factors of great importance and of unproven validity are those derived from the mathematical combination of operational and theoretical factors to aggregate the multiple interplays of combat events which would occur in actual war. The theoretical mathematical models are used in war gaming to simulate war operations in a manner which is a gross aggregation of the most complicated human conflict. The results obtained are always directly related to the input assumptions and factors. The repeated use of these models does not change this fact or improve their limitations. Nevertheless, it is necessary in solving this problem to use such factors. We wish to bring out that the factors thus derived--specifically, the Surprise Survival Rate, Enemy Resistance Survival Rates and Restrike Availability Rates--represent judgments of this Staff based on the results of war games which could be substantially at variance with reality.

D. DAMAGE ASSESSMENT CONSIDERATIONS

1. General

a. The directive for this study has prescribed the "minimum number of targets" which the United States forces must be clearly capable of destroying or neutralizing in order to prevail in general war. This was the basis for placing each target on each of the target lists.

b. The directive implies 100 per cent destruction or neutralization of the target list. Actually achieving 100 per cent effect on each target is impractical for it would require an infinite number of carriers and weapons. The determination of the damage to be achieved on a target requires consideration of two separate probabilities each of which encompasses many variables: first, the targeting probability of achieving the desired damage with a given sized weapon using the CEP of the weapons system; and second, the probability of a given weapons system for delivering the weapon to the bomb release line or cone of dispersion.

(1) The targeting problem becomes one of choosing the appropriate size weapon and the aiming point for the CEP of the weapons system. In the case of the first probability we have adopted the requirement of 90 per cent assurance of achieving the desired effects at the target. This is common practice and seems justifiable when one considers that to accept a lower assurance questions the ultimate worth of the target as a target, and to demand a higher assurance is unreasonably expensive. It should be noted that prescribing 90 per cent assurance of achieving a given level of damage does not result in 10 per cent of the targets receiving no damage, but rather that about 10 per cent would receive less than the prescribed damage and on the order of one to several per cent might receive no damage. This is variable, of course, depending on the specific hardness of a target (e.g., for hardened ICBM sites this could result in approximately 10 per cent not receiving sufficient damage). Thus, in determining weapons sizes and designated ground zeros (DGZ's) for each target list, the Defense Atomic Support Agency (DASA) followed specific instructions as to damage criteria and used a 90 per cent probability of achieving the prescribed damage.

(2) The second probability involved, that of placing a weapon at each specified BRL is a direct function of the several factors heretofore mentioned. The assurance achieved for any given force and the force required for any given assurance is remarkably sensitive to these factors. The Enemy Resistance Survival Rate (complement to attrition) alone can cause wide variations in the degree of assurance as it varies only slightly from the value assumed in this study. In order to provide a meaningful answer to this most complex problem we have indicated two levels of force requirements; that which will provide a 90 per cent assurance of delivering a weapon to each BRL and that which will provide 75 per cent. The force requirement necessary to provide these assurances of 75 to 90 per cent differ considerably. It is noteworthy that the programmed forces for 1963 would provide a degree of assurance that is essentially midrange.

c. The damage effects and casualties shown in this report for each of the various attacks on each target system were estimated by DASA based upon the prescribed size of weapon for each DGZ reaching bomb release line (or cone of dispersion) and detonating at a ground zero, the only variable used in determining the damage being the circular error probability for the weapons carrier. Thus, 100 per cent delivery of weapons on target was assumed, giving the optimum damage and casualties to be expected, the actual damage estimated being on the order of 90 per cent of that prescribed.

2. Judgments on Target Lists

a. Time did not permit either the war gaming of these target lists or Damage Assessments based on the DASA Damage Reports. In lieu thereof staff judgments were made.

b. Damage Assessment Reports on both the United States and the USSR from several full-scale war games were studied in detail. Although these reports are based on different target lists, different numbers and sizes of weapons and substantially varying circumstances and operational factors--and thus do not directly correlate--they still have provided a relevant basis for comparison. Detailed comparisons of DASA Damage Reports for each target list were made with the appropriate Damage Assessments from the war games. Using these comparisons as background, the judgments on each target list have consisted of determining whether the total damage and casualties estimated for an attack would actually achieve the objectives stated for the target system and place the United States in the position of prevailing in general war.

IV. DEVELOPMENT OF TARGET SYSTEMS AND FORCE STRUCTURES

A. APPROACH

1. Background. As a first step in the solution of the problem posed by NSC Action 2009, the Staff went through an educational process to determine the mechanics of target analysis and the development of target systems. This process continued throughout the study and included the following:

a. A comprehensive briefing on targeting was obtained from the Director of Targets, Office Assistant Chief of Staff, Intelligence, Headquarters, U.S. Air Force (AFCIN).

b. Two days at Offutt AFB, Nebraska, were devoted to the SAC concept of targeting. Immediately thereafter, the Staff visited Westover AFB, where they observed ground alert exercises and were briefed by the Commander, 8th Air Force, on war plans and by individual aircraft crew members on their targets.

c. Briefings were obtained from DASA on damage criteria.

d. A visit was made to the Sixth Fleet to observe Navy aircraft operations during a North Atlantic Treaty Organization (NATO) exercise and to obtain briefings on targets and tactics by individual crew members.

e. Visits were made to the 2d Region, U.S. Army Air Defense Command, Fort Meade, Maryland, and to NIKE batteries in the Washington Air Defense Area, where briefings and demonstrations were obtained on surface-to-air missile defense plans and operations.

f. Briefings were obtained from each Service on target lists prepared in response to SM 228-59, and the concepts underlying those lists.

g. The references listed in Sec I, paragraph E, above were thoroughly studied.

2. Concepts

a. As a preliminary step to the development of the target systems required by the Terms of Reference, it was necessary to:

(1) Study National Objectives in General War (NSC 5904/1), translate them into military objectives, and apply them as applicable to the development of target systems;

(2) Develop concepts for, and specify the types of targets to be included in, each target system;

(3) Determine general damage criteria for each target system.

Upon completion of the above, the Staff drew up a memorandum dated 4 May 1959, "Objectives, Concepts and Damage Criteria for the Development of Target Systems" (Annex C).

b. In general terms, the priorities and type targets listed in the Joint Strategic Capabilities Plan (JSCP) (JCS 1844/243) and Annex G thereto (JCS 1844/252) for primary initial undertakings in the event of general war were considered to comprise "a primarily military target system." Those listed for alternative undertakings in the event of general war (except for concurrent neutralization of enemy nuclear delivery capability) were considered to comprise a "primarily urban-industrial target system." The Optimum-Mix Target System was considered to be one which amalgamated the high priority targets of both primary initial and alternative undertakings.

c. Damage criteria contained in the memorandum of 4 May 1959 (Annex C) were those set forth in JCS 1844/252. As the study progressed certain deviations were made from these criteria. These deviations will be discussed in the succeeding paragraphs and in the appropriate annex for each target system.

B. PROCEDURES

1. General

a. In general, the step procedures outlined in the Terms of Reference (Annex A) were followed in the conduct of the study. Military, Urban-Industrial and Optimum-Mix Target Systems, together with damage criteria for each, were developed and forwarded to DASA for the determination of desired ground zeros (DGZ's) and weapons to attain the prescribed level of damage for each target. These DGZ's were plotted on the appropriate U.S. Air Force Target Chart Series 100 and studied by the Staff for tactical feasibility of delivery of the weapon or weapons prescribed. As a result of this analysis, adjustments in DGZ's or weapons were made as required. Adjusted target lists were then returned to DASA for damage estimates on the basis of appropriate weapon at each bomb release line (BRL). Upon completion of damage estimates the results were examined to determine if, in the judgment of the Staff, a sufficient level of damage had been achieved to place the United States in a position of relative advantage from which it could ultimately prevail. In those instances where the level of damage appeared insufficient, additional targets were selected and referred to DASA for damage assessment. At the conclusion of this process, the number of targets in each of the three target systems, was considered to closely approach "the minimum number of targets in each category which the United States retaliatory forces must be clearly capable of destroying or neutralizing in order to achieve the objective of prevailing in general war."

b. Operational factors, based on information from the Services and the results of past NESC military operations analyses, were then developed for application in accordance

with step 2.c. of the Terms of Reference. These factors were utilized in the determination of the force structures required for the delivery of weapons for each target system. This process is described in subparagraph 4 below, and in detail in Annexes E, F, and G.

c. In the calculation of force structure, three of the weapons systems contained in the definition of "Retaliatory Forces" in the Terms of Reference were omitted for the reason hereinafter stated:

(1) Navy Heavy Attack Aircraft. In 1963 the Navy will have three types of heavy attack aircraft, the A3D, A3J carrier aircraft and the P6M jet seaplane. When deployed, carrier task forces are normally in support of a theater commander and thus are classified as theater or tactical forces for purposes of this study. Additionally, the ability of carrier aircraft to strike high priority targets in the initial attack on the USSR and China depends upon the proximity of the carrier task force to the target at H-hour.

A maximum of 12 P6M aircraft are programmed for 1963. The small number of targets which could be assigned to this force did not appear to warrant its inclusion as a retaliatory force.

(2) Intermediate Range Ballistic Missile (IRBM). There are no IRBM units under U.S. control programmed for the 1963 time period, and the production program is approaching termination. Due to the range-required proximity of IRBM sites to Russian bases, the minimum warning of enemy missile attack, and the estimated low survivability of these missiles, they were not included in the force structures for these target systems.

(3) Intercontinental Cruise Missiles. Only 30 Snarks are programmed for 1963. The slow reaction time and low reliability of the then obsolescent missiles would result

in an insignificant number of targets against which they could be programmed. They were therefore excluded from the force structures for these target systems.

2. Target Systems. The methodologies followed in configuring the three separate target systems were not identical, although the Target Data Inventory (TDI) of June 1959 was used as the basic reference in the development of each. The basic intelligence and estimated military capabilities of the Sino-Soviet Bloc used in this study were obtained from the USIB "Coordinated Intelligence Assumptions for NESC Project 1959" and appropriate National Intelligence Estimates (NIE's). The Staff memorandum, dated 4 May 1959, on "Objectives, Concepts and Damage Criteria for the Development of Target Systems" (Annex C) provided the guidance for development of all target systems to the weapon application stage. Projected Order of Battle was obtained from the Services.

a. Military Target System. The objective of the Military Target System was the destruction of the type targets listed under "Primary Initial Undertakings" in the JSCP. The Order of Battle of the nuclear delivery forces was first plotted and targeted. The Target Data Inventory was then used for the selection of targets consisting of military controls, naval, submarine and air bases, and war-supporting resources capable of providing immediate and direct support to the nuclear delivery forces. The resultant list was furnished to DASA for calculations of DGZ's and weapons based on damage criteria of 90 per cent assurance of severe damage to nuclear capable forces and military controls, and 90 per cent assurance of lesser but significant damage to war-supporting resources. [redacted] Prior to obtaining damage estimates, selected primary and secondary government controls were added to the list.

(25)(x4), (25)(x5), (6.2)(a)

...damage
...industrial floor space (IFS) using optimum aircraft delivered weapons.

(3) Ninety per cent assurance of severe damage to 50 per cent IFS using intercontinental and fleet ballistic missiles.

After study of DGZ's, and adjustment where required, the list was returned to DASA for damage estimates. In order to have additional urban complexes available to add to the basic list in the event damage was not considered adequate to destroy the war-making industrial capacity, a list was developed of 18 additional priority complexes not already targeted. These cities were selected on the same basis as those on the initial list, and also submitted to DASA for separate damage estimate to ascertain the impact of destroying these additional cities.

c. Optimum-Mix Target System. This system combined the type targets listed under "Primary Initial Undertakings" and "Alternative Undertakings" in the JSCP. The highest

priority targets were selected from each of the other two systems and referred to DASA for calculation of DGZ's and weapons on bases of an aircraft delivered weapon solution and a combination aircraft-ballistic missile solution for the following damage criteria.

(1) Ninety per cent assurance of severe damage on nuclear capable forces and bases, and primary military and government controls.

(2) Ninety per cent assurance of lesser but significant damage on key transportation points and logistic support installations.

(3) Ninety per cent assurance of severe damage to 50 per cent of IFS in all urban complexes.

(4) Application of optimum weapons in each instance. After study of DGZ's, the weapons list was returned to DASA for damage estimates.

3. Damage Assessments. Detailed results of damage estimates for the appropriate target system are contained in Annexes E, F, and G.

4. Force Structures. In the development of the retaliatory forces required for each target system, the characteristics, numbers and posture of delivery systems programmed for 1963 were first considered. These considerations, supplemented by the results of past operational analyses, served as a basis for the derivation of the numerical values as required by the Terms of Reference. The specific basis for each of these factors is shown in Annex D.

The estimate of damage submitted by DASA for each target list was based on a required number of weapons reaching the BRL. The force requirements were in turn based on the application of the factors pertaining to each delivery system, and the desired assurance of placing a weapon at each BRL.

With respect to degree of assurance at each BRL, two approaches were used. In one instance the effectiveness factors were applied in "straight line" manner, which essentially would provide an assurance of 90 per cent with ideal distribution of weapons to BRL's. In actual practice, this flexibility is not attainable, and with the forces thus derived the actual assurance of placing a weapon at each BRL is in the range of 74-76 per cent. For sake of comparison, force requirements were also developed to provide an assurance of 90 per cent at each BRL.[1/]

(25)(x5)

[redacted]

The above procedures were followed throughout in the development of aircraft delivery requirements. In the case of missiles, forces were developed only for the requirement of 90 per cent assurance at each BRL.[1/]

1/ Where the choice lay between a number of weapons providing slightly under 90 per cent and an additional weapon which would provide substantially over 90 per cent, the lesser number was used.

V. OTHER MILITARY OPERATIONS

A. GENERAL

1. The minimum retaliatory target systems comprising this study designate the specific targets in the USSR and China which must be destroyed or neutralized in order to achieve the objective of prevailing in general war. Implicit in this ability to prevail, however, is the requirement that all other specified military operations outside the USSR and China will be successfully accomplished in conjunction with the strategic retaliatory attack. In order to delineate this problem and keep it within definable bounds, no attempt has been made to evaluate these specific other military operations. Although theater forces may have practically no warning and therefore a relatively low survival rate, it was assumed that the forces and weapons necessary to successfully carry out the theater operations would be available and that all missions in Section B, Joint Strategic Capabilities Plan (JCS 1844/243) which pertain to Theater Forces, Tactical Operations and Air Defense would be accomplished.

B. SPECIFIC EXAMPLES

1. Of prime importance under other military operations is the consideration that the U.S. air defenses must be capable of degrading any Soviet nuclear air or missile attack to a level commensurate with assurance of U.S. survival. Unless the air defenses of the United States are capable of this action, it is questionable whether the most effective targeting system against the Sino-Soviet Bloc, executed by the most efficient U.S. offensive forces, could

assure that the United States would prevail in a retaliatory war.

2. Although theater commanders are allocated forces and weapons for operations in their theaters, it is conceivable that there may be targets within the responsibility of the theater commander for which he would need assistance and request other forces to strike. No allowances are made in this study for forces and weapons from any Service which may be required for operations outside the USSR and China.

3. For the purposes of this study, the aircraft carrier forces of the Navy were considered to be operating under the control of theater commanders. Consequently, no strategic targets were assigned in this study to the heavy attack aircraft of the fleet. This is not to say that naval heavy attack aircraft might not be employed against some strategic type targets, nor by implication to degrade the vital role of these weapon systems as an integral part of our armed forces. The Sixth Fleet is responsible for many targets in the European Satellites and can, if required, strike others in the USSR. The Seventh Fleet can, and will, attack targets in China and eastern USSR. Whether these targets be "strategic" or "tactical" is a matter of judgment. The capability of theater and fleet commanders to recognize those which must be struck in the initial attack, and to apply all-weather capable forces against these targets, is recognized. Consequently, in the development of target lists within this study, targets which would most likely be allocated to naval carrier forces were omitted. However, responsibility for their destruction is implied to be assigned to naval carrier forces.

(2)

STAFF

NET EVALUATION SUBCOMMITTEE

NATIONAL SECURITY COUNCIL

APPRAISAL OF RELATIVE MERITS, FROM THE POINT OF VIEW OF EFFECTIVE DETERRENCE, OF ALTERNATIVE RETALIATORY EFFORTS (U)

ANNEX A Terms of References

ANNEX B Coordinated Intelligence Assumptions

ANNEX C Objectives, Concepts and Damage Criteria for the Development of Target Systems

ANNEX D Derivation of Factors

Appendix 1 - Application of Factors

ANNEX A

TERMS OF REFERENCE

20 February 1959

MEMORANDUM FOR LT. GENERAL THOMAS F. HICKEY
NET EVALUATION SUBCOMMITTEE

Subject: Appraisal of Relative Merits, from the Point of View of Effective Deterrence, of Alternative Retaliatory Efforts (U)

1. By NSC Action 2009, the President directed that an appraisal of alternative retaliatory efforts be undertaken. The Secretary of Defense, the Chairman of the Joint Chiefs of Staff, and the Special Assistant to the President for National Security Affairs were directed to determine the best means of defining and accomplishing such an appraisal. We have agreed on guide lines which define the problem and have determined that the staff of the Net Evaluation Subcommittee should undertake the study.

2. The broad terms of reference, which are intended to assist you in the development of the study, are attached hereto. These guide lines should not be interpreted as restrictive, and should not impose limitations on an objective evaluation of the problem. As the study progresses, you will undoubtedly wish to make adjustments which will be indicated by the material under consideration, and I should like to be advised of any major changes in the attached guide lines which you feel should be made.

3. It is desired that this study be completed by 31 October 1959. It should be given priority over your regularly assigned work. Your presentation of the regular study now in process may be delayed if this becomes necessary as a result of this priority assignment.

4. Upon completion of the study, it should be referred to me, as Chairman, Joint Chiefs of Staff, and I shall refer it to the Joint Chiefs of Staff for their consideration and comment prior to forwarding it to higher authority.

/s/ N. F. Twining
N. F. TWINING
Chairman
Joint Chiefs of Staff

Attachment
Terms of Reference

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20 February 1959

APPRAISAL OF RELATIVE MERITS, FROM THE POINT OF VIEW OF EFFECTIVE DETERRENCE, OF ALTERNATIVE RETALIATORY EFFORTS (U)

THE PROBLEM

In order to establish the relative merits, from the point of view of effective deterrence, of alternative retaliatory efforts directed toward: (a) primarily a military target system; (b) primarily an urban-industrial target system; or (c) an optimum mix of combined military-urban industrial target system; determine:

a. The minimum number of enemy targets by category which the United States retaliatory forces must be clearly capable of destroying or neutralizing in order to achieve the objective of prevailing in general war.

b. The U.S. retaliatory forces required to neutralize or destroy the targets determined in a above, and

c. The adequacy of the required retaliatory forces to contribute effectively to the national objective of deterrence.

THE APPROACH

The following guidance should be followed as closely as may prove to be practicable in developing the study.

STEP #1

Develop the following alternative lists, each consisting of a minimum number of targets by category which the United States retaliatory forces must be clearly capable of destroying or neutralizing in order to achieve, in conjunction with other specified military operations, the objective of prevailing in general war, assuming D-day to be 30 June 1963:

a. Primarily military targets. This target system should include consideration of Soviet Long Range Atomic delivery elements, both aircraft and missiles.

b. Primarily an urban-industrial target system.

c. An optimum mix of military-urban industrial targets.

STEP #2

Develop:

a. Criteria for desired weapon effects and acceptable probabilities of success against which to measure destruction or neutralization.

b. For each of the above target lists, the number of weapons, by yield and type of burst, required to satisfy the criteria in Step #2a, above.

c. Numerical values for the following operational factors and apply these factors to the number of weapons developed in Step #2b, above, to determine the force required for each of the target lists:

(1) In-commission Rate - the fraction of the force ready for use at any given time.

(2) Surprise Attack Survival Rate - the fraction of the ready force surviving a surprise attack. (Consideration should be given to the probable increased survivability of forces on alert.)

(3) Reliability Rate - the fraction of the surviving force launched successfully and penetrating to the line of enemy resistance.

(4) Enemy Defense Suppression Rate - the fraction of launched force programmed against the target lists developed in Step #1 above. (It may be advisable, under certain plans of employment, to program a portion of the attacking force against enemy defenses not included in the target lists in order to enhance the survivability of the principal attacking force.)

(5) Enemy Resistance Survival Rate - the fraction of the launched force penetrating the line of enemy resistance and surviving to the Bomb Release Line.

(6) Delivery Effectiveness Rate - the fraction of the surviving force delivering effective weapons.

(7) Weapons per Carrier Rate - the average number of weapons carried per vehicle.

(8) Re-strike Availability Rate - the fraction of aircraft returning to a re-strike base.

STEP #3

Based upon a recapitulation of weapons and forces required and total damage effects, appraise the adequacy of each of the force structures thus developed as an effective deterrent to general war. This appraisal will involve principally the application of judgment factors to the size, posture, and composition of the U.S. forces, the Sino-Soviet Bloc pre-D-day capabilities and post-D-day residual capabilities. These factors should be based upon estimates of Soviet capabilities, intentions, beliefs, and probable courses of action.

STEP #4

Formulate appropriate recommendations which may include consideration of the projection of trends beyond 30 June 1963.

DEFINITION

"Retaliatory forces," for the purpose of this study are as follows:

Strategic bombers (heavy and medium) used as bomb carriers, strategic bombers (heavy and medium) used to launch air-to-surface strategic missiles, Intercontinental Ballistic Missiles,

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Intercontinental Cruise Missiles, Intermediate Range Ballistic Missiles (to include Fleet Ballistic Missiles), and Naval heavy attack aircraft.

ASSUMPTIONS

1. Under conditions of tactical warning only, initial surprise attack by the USSR would occur. With few exceptions, the warning of enemy surprise attack at the operational level of command would be not less than 15 minutes.

2. Under conditions of strategic warning, a minimum of 24 hours warning time will be available.

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NSS Declassification Review [EO 13526]
DECLASSIFY IN FULL
by Mary Ronan on 11/7/2012

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TS#141939-f

ANNEX B

3

CENTRAL INTELLIGENCE AGENCY

15 May 1959

MEMORANDUM FOR: The Director, Net Evaluation Subcommittee of the National Security Council

SUBJECT : Intelligence Requirements of the NESC

1. Attached are Coordinated Intelligence Assumptions for NESC Project, 1959, submitted in response to your request of 6 March 1959. These assumptions were concurred in by the United States Intelligence Board on 12 May 1959, with the exception of the Assistant Director, Federal Bureau of Investigation who abstained, the subject being outside of his jurisdiction.

2. The USIB recognizes that for its purposes the NESC requires quite specific, unequivocal assumptions, and every effort has been made to provide them. Your attention is invited to the qualifications and caveats set forth in the Foreword. In view of these qualifications and caveats, as well as the special-purpose requirement to be met by the Coordinated Intelligence Assumptions, it is requested that these materials be given limited distribution.

/s/

ALLEN W. DULLES
Director

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW	
1st REVIEW-DATE: 11/16/06 AUTHORITY: DC DD NAME: TY SANDERS	DETERMINATION [CIRCLE NUMBER(S)] 1. CLASSIFICATION RETAINED 2. CLASSIFICATION CHANGED TO: (3) CONTAINS NO DOE CLASSIFIED INFO 4. COORDINATE WITH: 5. CLASSIFICATION CANCELED 6. CLASSIFIED INFO BRACKETED
2nd REVIEW-DATE: 5/17/07 AUTHORITY: DD NAME: N. Connelly	(7.) OTHER (SPECIFY): WFall.

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Authority NLE 2012-13 #3
By NMK NLDDE Date 1/16/13

ANNEX B

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attachment to
TS# 141939-59 F
28 May 1959

COORDINATED INTELLIGENCE ASSUMPTIONS FOR NESC PROJECT, 1959

THE PROBLEM

To provide, for the special-purpose use of the Net Evaluation Subcommittee, coordinated intelligence assumptions with respect to certain Soviet military capabilities and US warning capabilities in mid-1963, as set forth by the NESC in an "Outline of Specific Coordinated Intelligence Required for Special NESC Project."

FOREWORD

1. In preparing these coordinated assumptions, it has been recognized that for its purposes the NESC requires quite specific numerical projections for the mid-1963 period. The views of individual agencies have in some cases been compromised in an effort to meet this requirement. Likewise, numerical projections have been made in some areas where the present state of our knowledge might not justify their inclusion as estimates in an NIE for general distribution.

2. For the most part, these Assumptions represent projections of the programs and capabilities underlying the Assumptions for mid-1962 submitted in October 1958. Some of the changes result from additional evidence and re-analysis since that time. The present contribution, like its predecessor, is based on the broad assumptions that:

a. there will be no international agreement on the limitation or control of armaments during this period;

b. the USSR is not and will not during the period of this estimate be preparing for general war to begin at any particular date in the future. (i.e., that the date mid-1963 has no special significance in Soviet planning for general war);

c. Soviet programs for production and operational deployment of weapon systems will be affected by considerations of maximum utilization of proven military hardware, optimum effectiveness vs. cost, minimum loss or wastage due to obsolescence factors, and maximum efficiency in the utilization of available resources.

3. In sum, we believe that the Coordinated Intelligence Assumptions contained in the following pages are feasible and reasonable for the special purpose for which they are required, but it is emphasized that they must be treated as assumptions and not as estimates of Soviet strengths in mid-1963.

THE ASSUMPTIONS

A. SOVIET NUCLEAR DELIVERY VEHICLES IN MID-1963

1. Number of Delivery Vehicles in Soviet Operational Units

(a) Heavy Bombers/Tankers

BEAR:	30
BISON:	160
Advanced:	10
Total:	200

Advanced types are assumed to comprise high-energy chemical bombers capable of supersonic speed and high altitude, and possibly a few subsonic nuclear-powered aircraft capable of long endurance, even at low altitudes. See NIE 11-4-58, para. 145.

(b) Medium Bombers/Tankers

BADGER:	500	Long Range Aviation
	675	Tactical and Naval Aviation
	1175	SUBTOTAL
Supersonic "dash" medium:	300	Long Range Aviation
	1475	TOTAL

(c) Jet Light Bombers

BEAGLE	: 330	Naval Aviation
	1930	Tactical Aviation
	2260	
Supersonic Tactical:	175	Tactical Aviation
	2435	

The total of BEAGLEs above includes about 425 aircraft of this type in reconnaissance, utility, and liaison roles, not included in Assumptions for mid-1962.

(d) Air-to-Surface Missiles

AS-1, 55 n.m.: 450

AS-2, 250 n.m.: 700

(e) Intercontinental Ballistic Missiles

Number: 750, of which one-third assumed to have all-inertial guidance.

Deployment: Assumed to be in 75 ICBM units, each with 10 missiles. One-half the missiles of each unit

can be set up to launch in salvo. Assumed that 50 percent of the units will be deployed at static sites hardened to withstand average of 25-50 psi over-pressure; 50 percent in rail mobile systems with several alternative launch points per missile unit.

(f) Other Ground-launched Ballistic Missiles*

SS-4, 700 n.m. missile: 400

SS-5, 1100 n.m. missile: 500

Deployment: Road and/or rail mobile with four missiles per launcher. One-fourth of missiles can be set up to launch in salvo.

900

* Ground-launched ballistic missiles of less than 700 n.m. maximum range, some of which would be equipped with nuclear warheads, were excluded upon consultation with NESC Staff representative.

(g) Guided Missile Submarines

Equipped with 200 n.m. cruise-type missiles: 36

(1) Current long-range classes converted for topside stowage -- 14

Missile capacity -- 2 each

(2) New design, conventional power, constructed for internal missile stowage -- 22

Missile capacity -- 4 each

Equipped with 1000 n.m. ballistic missiles: 12

New design, nuclear power, constructed for internal missile stowage -- 12

Missile capacity -- 8 each.

(h) Submarine-launched Missiles

SS-7, 200 n.m. cruise-type missiles: 250

SS-8, 1000 n.m. ballistic missiles: 150

(i) Decoys and Anti-radar Missiles

Air-launched: could be available in quantity as needed.

See NIE 11-5-58, paras 51-52.

Ground-launched: None.

(j) Earth Satellites of Military Significance

In mid-1963, the USSR could have in orbit surveillance satellites employing photographic or TV reconnaissance, infra-red photography and/or ELINT. Optical photographic and TV systems capable of approximately 100-200 feet resolution; infra-red system approximately 1000-2000 feet.

2. Performance Data for Above Vehicles

(a) Missile characteristics: See NIE 11-5-58, Annex A, Tables 3-5, except that:

(1) In Table 3, the alternate guidance system permitting the AS-1 missile to be used against poorly defined targets should be deleted.

(2) In Table 3, the maximum operational range of the AS-2 missile should be changed to at least 250 n.m., its guidance should be assumed to be inertial mid-course and radar/radio command terminal guidance with CEP of $\frac{1}{2}$-2 n.m., its gross weight approximately 15,000 pounds.

(3) In Table 5, the SS-7 should be assumed to have inertial guidance with CEP of 2 n.m., and to be capable of low altitude approaches at less than 1,500 feet.

(b) Medium and heavy bomber characteristics: See NIE 11-4-58, Annex, Table 6, except that the column headed "BISON 1958" should be considered as replacing the column headed "BISON" under "Current Models."

(c) Light bomber characteristics: See NIE 11-4-58: Annex, Table 7, except that:

(1) All BEAGLEs should be considered as having the characteristics shown in the column headed "1950 BEAGLE";

(2) Footnotes 2/ and 3/, explaining the estimated combat radius and range of the Supersonic Tactical bomber, should be amplified to read:

2/ Includes 50 n.m. dash radius at Mach 1.06.

3/ Includes 100 n.m. dash at Mach 1.06.

(d) Submarine performance: See NIE 11-4-58, Annex, Table 12, except for the changes and additional materials given below. All data below should be regarded as tentative, submitted for purposes of these Assumptions pending completion of a thorough re-examination of Soviet submarine performance.

(1) In Table 12, under Speed (kts)/Endurance (n.m.), Maximum, Surfaced, change "Z" class figure from 16/6900 to 20/5800, and change "W" class figure from 15/6000 to 17/3650. Under Speed (kts)/ Endurance (n.m.), Cruising, Submerged, change "Z" class figure from 3/108 to 3/190.

(2) Tentative characteristics and performance estimate, "F" class:

Length (ft):	320
Beam (ft)	28
Displacement (tons)	
Surfaced:	2,300
Submerged:	2,650
Diving limit (ft):	700
Armament	
Torpedoes:	24
Mines:	48
Speed (kts) /Endurance (nm)	
Surface max.:	20/6,400
Cruising:	10/20,000
Snorkeling max.:	12/8,000
Cruising:	8/15,000
Sunberged max.:	17/8.5
Cruising:	3/190

Operating Radii/Days on station (under conditions stipulated in NIE NIE 11-4-58, Annex, Table 12)

8500 n.m. 1 day
7500 n.m. 15 days

(3) Tentative characteristics and performance estimate,

first Soviet nuclear powered submarines:

Length (ft):	320
Beam (ft):	28
Draft (ft)	25 max.
Displacement, Ssurfaced (tons):	3,600
Diving limit (ft):	700
Propulsion:	10,000 - 15,000 SHP, twin screw, one pressurized-water reactor, capable of achieving 24 knots submerged speed, and with equivalent of 2,000 hours endurance at full power.

B. REACTION TIME AND SERVICEABILITY OF SOVIET DELIVERY SYSTEMS IN MID-1963.*

1. Soviet Bomber Force

(a) Assuming the continuation of present trends under normal conditions, by mid-1963 some 30-40 percent of LRA medium and heavy bombers and tanker aircraft will be engaged in daily flight training activities except on weekends and at holiday periods, and an additional 30-35 percent of LRA aircraft will be grounded for maintenance. The remaining bombers and tankers, some 30 percent of the force, could constitute a continuing alert force should Soviet planners so desire. Such a force could be ready on short notice to become airborne for its own protection or depart for staging bases or assigned missions. During periods of international tension, the size of such a continuing alert force could be increased by reducing the number of aircraft engaged in training flights, and by intensifying maintenance activity. There is no present indication that the Soviets are concerned with the development of an alert force of this type.

* Reaction time as used in this discussion refers to the time required to launch specified weapon systems on combat missions after receipt of orders by units. It does not take into account time required for decision making by central authorities, for coordination between principal commands, or for dissemination of orders.

(b) Should Soviet planners elect to mount surprise air attacks after a preparatory standdown, they might consider that a relatively brief standdown could be concealed from detection, particularly if it occurred over a weekend, at the time of a Soviet holiday, or during unfavorable weather. About 75 percent of the LRA bomber and tanker force could be serviceable for military operations after a two-day standdown.

(c) After a five-day standdown, about 90 percent of the bombers and tankers in LRA combat units could be serviceable for military operations. (See, however, the implications for warning discussed in Section G).

(d) These factors apply to the jet medium bombers of Tactical and Naval Aviation as well as Long Range Aviation as a whole. They also apply to jet light bombers with the exception that about 80 percent of the aircraft of this type could be serviceable after a two-day standdown.

2. Ground-launched Ballistic Missiles

The reaction time of Soviet missile units would vary according to the type of missile, its location (i.e., on or off site) and degree of alert.

(a) On Site. The following reaction times are estimated for the longer range (700 n.m. or more), conventionally fueled missiles under different alert conditions. In all cases, the time required to launch a second salvo is estimated at 2-4 hours.

Case I -- reaction time 2-4 hours. Crews on routine standby, electrical equipment cold, missiles not fueled but could have been checked out recently.

Case II -- reaction time 15-30 minutes. Crews on alert, electrical equipment warmed up, missiles not fueled.

Case III -- reaction time 5-15 minutes. Crews on alert, electrical equipment warmed up, missiles fueled and occasionally topped. This ready-to-fire condition probably could not be maintained for more than 10-15 hours.

(b) Mobile Units. The follwing reaction times are estimated for launching the first missile after the mobile unit has arrived at the site (normally prepared in advance).

700 n.m.	2-4 hours after arrival at site
1,100 n.m.	2-4 hours after arrival at site
ICBM	4-6 hours after arrival at site (rail mobile system)

Once the unit is established on the site, reaction time and reload capability would be approximately the same as in 2. (a), above.

(c) Submarine-launched Missiles. The following reaction times are estimated for on-station, alerted submarines.

SS-7	200 n.m. cruise type 30 min.
SS-8	1,000 n.m. ballistic 5-15 min.

(d) Missile reliability. The following assumptions regarding Soviet missile reliabilities under operational conditions in mid-1963 are proposed for use by the NESC. Because of limited information available on the operational aspects of either the Soviet or US missile programs, there is considerable question as to the validity of these figures.

In the following table:

Column 1 is the missile designation.

Column 2 is the percentage of missiles organic to operational units that will appear "good enough to try" to launch at any given time, i.e., serviceability rate.

Column 3 is the percentage of those missiles considered "serviceable" (column 2) that will actually get off the launcher when fired.

Column 4 is the percentage of those missiles that get off the launcher (column 3) that will actually reach the vicinity of the target.

ASSUMED RELIABILITIES OF SOVIET MISSILES, MID-1963

COLUMN 1	COLUMN 2	COLUMN 3	COLUMN 4
AS-1	80	90	80
AS-2	75	80	65
ICBM	80	90	75
SS-4	85	90	80
SS-5	85	95	80
SS-7	85	80	75
SS-8	80	85	75
SA-1	80	90	90
SA-2	80	90	90
SA-3	80	90	85
SA-4	80	85	80
SA-6	85	90	90
SA-7	85	85	85
AA-2	85	85	80
AA-3	85	90	85
AA-4	75	90	75

NOTES:

1. Out-of-service missiles of sub-launched, air-to-surface and air-to-air types would not be loaded into submarines or aircraft.

2. The assumptions made for air-to-surface and air-to-air missiles do not include losses due to aircraft aborts which are caused by non-missile related items.

C. SOVIET STRATEGY IN MID-1963

1. Soviet Concepts of War as an Instrument of Policy*

(a) We believe that at least for the period of this estimate the Soviet leaders will continue to pursue the struggle with the West primarily by political, economic, and psychological warfare. Despite the continuing growth of their military power, in particular their growing capabilities for nuclear attack on the US, we continue to believe that they will not wish deliberately to initiate general war. They will probably estimate that they could not be certain of winning a general war, even with surprise nuclear attack, and that the scale of damage the USSR would suffer in such a war would threaten the survival of their society. It is probable that in the Soviet view both sides are now militarily deterred from deliberately intiating an all-out nuclear war or from reacting to any crisis in a manner which would gravely risk such a war, unless vital national interests at home or abroad were considered to be in jeopardy.

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* Fpr a fuller discussion of this subject see NIE 11-4-58, paragraphs 99-110 and 224-227.

(b) Accordingly, the Soviet leaders would almost certainly not initiate general war by mid-1963 unless they believed either that they must choose between initiating war and conceding a position to the West which would threaten the survival of their regime, or that the US was irrevocably committed to the early launching of an all-out nuclear attack against the USSR. Assuming that they did decide to initiate general war they would probably do so either during the progress of a limited war or during a period of intense international crisis.

2. Prevailing Soviet Doctrine Regarding Surprise Attack

(a) Soviet recognition of the importance of surprise in modern military operations has been reflected in articles and statements over the last few years, but it is evident that Soviet military theoreticians do not regard surprise as the decisive factor in the outcome of a major war between great powers. In fact, they hold that in such a war the strategic attack capabilities of both sides might expend themselves and leave eventual victory to the side with the greatest residual strength, capacity for recovery, and ability to occupy territory. They visualize an

important role for their ground, tactical air, and naval forces in a general war, which in their view would probably become a protracted war of attrition.*

(b) We believe, however, that the Soviets recognize that very great advantages would accrue to the side striking the first blow in an all-out nuclear war, and that therefore if they decided on general war they would initiate it by strategic nuclear attacks. The Soviets would probably not count on achieving surprise against all Western nuclear striking forces. They would, nonetheless, attempt to achieve maximum feasible surprise.

(c) We believe that if the Soviet leaders ever became convinced that the US was committed to the imminent launching of a surprise attack on the USSR, they would launch a pre-emptive surprise attack in an attempt to seize the strategic initiative. Such an attack by its very nature would not take place at a time selected and planned for in advance by the Soviets, and therefore would not represent optimum preparedness or reflect conviction that requirements for the total neutralization of the Western retaliatory force had been met.

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* ~~The representative of~~ the Assistant Chief of Staff, Intelligence, USAF, believes that as written this paragraph does not correctly reflect the Soviet judgment of the role of surprise in a general war. He believes it is evident that Soviet military theoreticians consider surprise probably would be the decisive factor in the outcome of a war between great powers.

(d) Soviet doctrine on the importance of surprise is not expected to change significantly by mid-1963.

3. Soviet Concepts for Strategic Attack

(a) Given the varied and dispersed weapon systems the Western Powers will be capable of employing for retaliatory attack on the USSR in 1963, the Soviets would not expect to be able to neutralize this capability wholly, even if they succeeded in launching a maximum scale surprise attack. Nevertheless, they would be concerned to save as large a proportion of their resources as possible for phases subsequent to initial retaliation. Thus the highest priority objective of the Soviet concept for strategic attack would be to reduce Western nuclear strategic attack capabilities as rapidly as possible.

(b) In planning for an attack against Western nuclear retaliatory capabilities, the Soviets would seek to seize the initiative and to maximize surprise to the extent consistent with the necessary weight of attack. A small sneak attack relying on surprise is highly improbable. General war would probably begin at a time of

tension, when Western strategic forces were in alert status, and the Soviets would probably not expect to be able to destroy all such forces.

(c) The Soviet strategic attack concept would also include the objective of reducing Western ability to conduct military operations over an extended period of hostilities. Consequently, they would wish to attack control, communications, industrial and transportation centers at an early phase. There would in any case be a bonus effect on these targets as well as urban centers from attacks on Western strategic nuclear capabilities.

(d) The timing of the diversified operations likely to make up the Soviet attack would pose extremely complex problems to Soviet planners. In spite of reliability and accuracy factors, the inherent speed of delivery and relative invulnerability of the ICBM render this weapon a most likely choice for initiating the assault on North America. They would probably arrange for the dispatch of manned bombers only at a time and on a scale compatible with the security of surprise for ballistic missile attack. Soviet bombers would probably utilize air-to-surface missiles against the more heavily defended targets. Soviet guided missile submarines

would probably be employed against North American land targets within missile range; the scale of their use in an initial attack would depend on the Soviet judgment of the risk of premature disclosure of intent.

(e) Coordinated attacks would be launched against selected priority targets in Eurasia as well as in North America.

D. SOVIET AIR DEFENSE IN MID-1963

We have reviewed our most recent summary of Soviet air defense forces and capabilities, in NIE 11-4-58, "Main Trends in Soviet Capabilities and Policies, 1958-1963," paras. 157-168, and consider them generally valid. The following materials are intended to amplify our recent summary, primarily with respect to the mid-1963 period, and to provide up-to-date tables on Soviet air defense weapons and equipment.

1. Organization, Procedures, and Coverage

(a) The Soviet air defense system in mid-1963 will continue to comprise a number of air defense areas and districts which, in conjunction with the closely integrated air defense capabilities of other Bloc nations, are intended to provide defense in depth for major target areas in the USSR. Soviet Air Defense Forces (PVO Strany), whose commander-in-chief is a Deputy Minister of Defense, will continue to have operational and administrative control over PVO forces, whose sole mission is air defense. It will also be responsible for the operational integration and coordination of other forces with air defense capabilities assigned to major field commands and fleet areas.

(b) We do not have full information on Soviet procedures for utilizing all the various elements with capabilities for air defense, including air control and warning systems, fighters of various components, anti-aircraft artillery, surface-to-air missiles, quasi-military and civilian agencies, and forces of other Bloc nations. Major regional air defense headquarters at Moscow and Khabarovsk appear to have central control over air defense information and operations in Western and Far Eastern USSR, respectively. Despite this high degree of centralization, at least some authority with respect to scrambling fighters and even intercepting suspected intruders appears to be delegated to echelons as low as fighter division and air defense subdistrict. Existing operational procedures for air defense forces, together with routine PVO clearance of all civil and military flights in the USSR, appear adequate under present peace-time conditions. Re-adjustment will probably be required during the period to mid-1963, however, to provide for the proper coordination of surface-to-air missiles and fighters, to permit maximum use of the capacities of improved air defense warning and control systems, to allow for increased civil air traffic, and to take account of increased speeds and varied flight profiles of Western offensive weapon systems. It is possible, therefore, that under

wartime conditions in mid-1963 increased command responsibility would be given to air defense district controllers, so as to maintain relatively centralized control but avoid a low threshhold of saturation. This could be accomplished without major change in the basic organization of the air defense system.

(c) Air defense coverage in mid-1963 will continue to be greatest in Western USSR and the East European Satellites, with concentrations in key localities outside that general area, especially in the Urals, along the Transiberian Railroad, and in the southern portion of the Soviet Far East. Moscow will remain the single most heavily defended area, with Baku, Leningrad and a few other targets also having especially heavy concentrations of air defense weapons. As improved surface-to-air missile systems become available, missile defenses with both high and low altitude capabilities will be provided for numerous Soviet fixed targets as well as field forces and naval vessels. Radar early warning coverage will extend completely around the Bloc's periphery, with the possible exception of the mountainous borders of southwestern China and Tibet. Land-based radars on Arctic Islands, airborne pickets, and picket ships will be widely employed to extend early warning lines, and some of these may be

provided with intercept-control as well as early-warning equipment in order to permit initial intercept attempts as far from Soviet targets as possible.

2. Performance Characteristics of Radars and Weapons

(a) Fighters. See Table 9, Annex, NIE 11-4-58, except that in the column headed "All-weather fighter 1959" the time to climb to 40,000 feet should be increased from 2.2 to 3.0 minutes. Re-analysis since publication of this table has resulted in minor changes in estimated performance of certain other fighters, but none of these changes are considered significant for purposes of these Assumptions.

(b) Fighter Serviceability. We assume that in mid-1963, routine serviceability of Soviet fighters without prior stand-down would be approximately 75 percent. Serviceability after a two-day stand-down would be approximately 80 percent. After a five-day stand-down approximately 85 percent.

(c) Guided Missiles. See NIE 11-5-58, Annex A, Tables 1 and 2.

(c) Anti-Aircraft Guns

ESTIMATED PERFORMANCE FOR ANTI-AIRCRAFT GUNS USED IN THE SOVIET BLOC AIR DEFENSE SYSTEM

Weapon	Weight of Projectile (lb.)	Muzzle Velocity (ft. per sec.)	Rate of Fire (rounds per minute)	Effective Ceiling (ft.)
Soviet				
14.5-mm AAMG ZPU-2 (dual) and ZPU-4 (quadruple) Mount	.12	3,300	150 per barrel (practical)	3,000
37-mm Automatic AA Gun M39	1.61	2,887	160	4,500
57-mm AA Gun S-60	HE-6.17 AP-6.90	HE-3,281 AP-3,281	60 (practical)	6,000 w/on-carriage fire control.
			105-120 (cyclic)	16,000 w/off-carraige fire control.
85-mm AA Gun M44	20.3	2,950	15-20	33,500
100-mm AA Gun KS-19*	34	2,950	15	45,000
122-mm AA Gun M55*	55	3,300	10-12	45,000
Czech				
30-mm Twin AA Gun M53	1	3,000	120 per gun (practical) 600 per gun (maximum)	7,000

* VT fuze assumed to be available.

(d) Radar. Re-analysis of available evidence and estimated Soviet capabilities in radar design and construction have resulted in a significant increase in the estimate capabilities of current and future Soviet radar equipment. The following tables supersede Table 10 of the Annex to NIE 11-4-58.

ESTIMATED PERFORMANCE CHARACTERISTICS OF SOVIET AIRBORNE INTERCEPT RADAR

Aircraft	Radar	B-47 Type Target		Remarks
		Search Range (n.m.)	Track Range (n.m.)	
FRESCO D&E	SCAN ODD	5-6	2-3	
FARMER B	Improved SCAN ODD	7-9	3-5	
FARMER C	-	3	3	Range only radar with possible infra-red supplement for angle data.
FLASHLIGHT A&C	SCAN THREE	12-16	6-10	
FITTER	-	3	3	Range only radar with possible infra-red supplement for angle data.
FISHPOT	-	12-14	8-9	With possible infra-red supplementary system.
1959 All-weather	-	30	20	With possible infra-red supplementary system.
1962 All-weather	-	40	25	With possible infra-red supplementary system.

y Warning and GCI Radars

Ground Controlled Intercept*

Altitude rage ft.)	Detection Range at 25% blip/scan Ratio (n.m.) B-47 nose-on	F-100 nose-on	Altitude Coverage (ft.)
,000			
,000			
,000			
,000	110	101	70,000
,000			
,000	168	155	110,000
,000			
	185	170	118,000
,000			
	224 (216)**	208	180,000
,000			
,000			
	224 (220)**	208	220,000
,000	(400)	(400)	300,000

.65 for a 75% blip/scan ratio. Altitude coverage

ratio would exist.

; these ranges a higher blip/scan/

3. Numbers of Interceptors and Air Defense Missiles (actual strength in operational units, mid-1963)

(a) JET FIGHTER AIRCRAFT

Area	Day Fighters[1]	All weather	Total[2]	Regiments
NORTHWESTERN USSR	900	400	1,300	39
WESTERN USSR	1,500	675	2,175	66
WEST CENTRAL USSR	950	425	1,375	42
CAUCASUS USSR	700	325	1,025	31
EAST CENTRAL USSR	450	200	650	18
FAR EASTERN USSR	900	400	1,300	39
TOTAL WITHIN USSR	5,400	2,425	7,825	235
SOVIET FORCES EAST EUROPE	600	275	875	26
(TOTAL SOVIET)	(6,000)	(2,700)	(8,700)	(261)
EAST EUROPEAN SATELLITES	2,700	425	3,125	98
TOTAL WITHIN EASTERN EUROPE	3,300	1,100	4,400	137
COMMUNIST CHINA AND NORTH KOREA	2,300	350	2,650	79
TOTAL BLOC	11,000	3,425	14,425	438

1/ It is assumed that about 40 percent of the Soviet aircraft in this category will be equipped with some form of an infra-red fire control system as an aid to intercept and attack in clear weather, day or night. A few European Satellite and Asiatic Communist aircraft might be similarly equipped.

2/ Does not include jet trainers.

(b) It is assumed that in mid-1963 the fighters in Soviet units will be divided by type as shown below. (Operational fighters of other Bloc nations will be primarily FRESCO types, supplemented by FARMERs and FLASHLIGHTs.)

FAGOT	100
FRESCO A, B, C	2500
FRESCO D	600
FARMER	600
FLASHLIGHT	100
FACEPLATE/FISHBED	1600
FITTER	1200
1959 A/W	400
FISHPOT	1500
1962 A/W	100
TOTAL	8700

(c) Air Defense Missiles

NIE Designation	Number of Missiles in operational Units	Number of Operational Units 1/	Deployment
SA-1		No longer in service	
SA-2	17,500	125	Static and mobile
SA-3	22,500 2/	150	Static and mobile
SA-4	27,000	200	Static and mobile
SA-5		Not yet in service	
SA-6	1,300	2 cruisers 22 destroyers	---- ----
SA-7	700	7 cruisers 0 destroyers	---- ----
AA-1		No longer in service	
AA-2	12,000	Day fighters	----
AA-3	14,000	All-weather fighters	----
AA-4	4,200	All-weather fighters	----

1/ SA-2, SA-3, and SA-4 units are assumed to be battalions, each with three or four batteries.

2/ The Assistant Chief of Staff, Intelligence, USAF, believes that 7,200 SA-3 is a more reasonable assumption, based on his estimate that first operational capability date will probably be 1960-1961, rather than 1959-1960 as estimated by the majority.

4. Capabilities and Vulnerabilities in Electromagnetic Warfare

(a) At present, the USSR has an appreciable capability for jamming Western radars at frequencies up to 10,000 mc/s and possibly higher and especially for jamming at lower frequencies normally used in Western long-range radio communications. We believe that during the period to mid-1963 the USSR will be capable of degrading the performance of Western radar and other electronic equipment, and hence the weapons controlled by such equipment. Present capabilities will be enhanced by the use of improved techniques and higher powers. Shipboard and ground jamming equipment for use against X-band blind bombing radar is known to exist. The USSR is also currently employing passive equipment believed capable of detection and direction finding against signals from the very low frequencies up into the microwave spectrum.

(b) In the past few years, the Soviets have demonstrated a trend toward greater frequency diversification, particularly in ground radar equipment. Increased power and other anti-jam techniques also appear to be receiving attention, and are probably incorporated in the latest equipment. All new equipment will be designed with an electromagnetic warfare environment in mind. Through mid-1963, however, Soviet electronic systems will probably still be subject to disruption by properly employed techniques.

5. Air Facilities

(a) Air facilities adequate for air defense purposes exist in most parts of the USSR. We assume that in mid-1963 available airfields and associated logistic and maintenance facilities will support a high degree of mobility and dispersal for fighter units in the European Satellites and the USSR, with the possible exception of those in the central Arctic and central Siberian region.

(b) Although facilities in the Arctic are not as numerous as in other areas, a marked improvement in both quantity and quality has been detected during the past year, and is believed to be part of a program of several years' duration. Improvements will continue to be made, but in mid-1963 fighter operations in the Arctic will still be limited to some extent by difficulties of maintenance and supply, and by a requirement for staging and recovery of bombers.

(c) Airfields and facilities in Manchuria and China are sufficient to support the air defense of important targets in these areas, but we assume that in mid-1963 their number and quality will continue to limit the mobility and dispersal of fighter units.

6. Air Defense Reaction Time

(a) The circumstances under which hostilities arose would have an important effect on the ability of the USSR to bring a maximum air defense effort to bear against Western retaliatory forces. From the point of view of a Soviet air defense planner, it would be desirable to have at least two and preferably five days' advance notice, so as to permit maintenance standdowns and other measures designed to insure a high rate of serviceability of equipment. Measures to prepare air defense forces for military operations would probably be undertaken in times of increased international tension, but full preparation might be impossible in many instances, as for example in the case of a decision for pre-emptive attack, taken at what Soviet planners considered to be the last moment. Even if considerable advance notice could be made available, the USSR might elect to hold air defense preparations to a minimum until the West could be reasonably certain to have knowledge of the initial Soviet attack, in order to reduce the chances of giving advance warning.

(b) Assuming that the USSR initiated general war by its own strategic nuclear assaults, generalized warning could be given in time to alert serviceable air defense forces in most areas prior to the arrival of retaliatory attacks by Western aircraft and cruise-type missiles.

(c) Early warning radar could now give Moscow and many other targets in the interior more than one hour's warning of attacks made with present operational Western bomber types. The more limited warning time available in Bloc border areas would reduce the effectiveness of the defenses of even heavily-defended targets in such areas. As the speeds of Western delivery vehicles increase the problems of warning and reaction time will become more critical. No meaningful assumption can be made at present regarding Bloc detection and reaction times against ballistic missiles.

(d) During the period to mid-1963, Soviet efforts will probably include introducing early warning and GCI radars with improved range and detection capabilities, closing gaps in radar coverage, employing airborne and seaborne pickets, and extensively deploying semi-automatic data-handling equipment. We assume that the USSR will also continue its present practice of maintaining a few fighters in each regiment (normally two but occasionally four or more) on two-minute strip alert at all time, and that some elements within surface-to-air missile units will be held in five-minute alert condition in mid-1963. The time required for associated warning radars and control systems to detect and identify attacking Western delivery vehicles, to establish their tracks, and to transmit orders to appropriate

defensive units is estimated at 2-5 minutes in the mid-1963 period, the lower figure applying primarily to those areas served by semi-automatic control systems. Thus, reaction time to scramble the first alert fighters of a given unit in mid-1963 is assumed to be 4-7 minutes, and to launch the first surface-to-air missiles 7-10 minutes.

(e) Total time required to complete initial interceptions would depend on the speeds and armament of the particular defensive weapons involved, as well as the speeds, altitudes, and courses of Western delivery vehicles. For example, the highest-performance fighter in operational Soviet units in mid-1963 will probably be able to climb to 40,000 feet altitude in less than two minutes, but most will require considerably longer. The capabilities of the USSR to intercept large numbers of aircraft and cruise-type missiles over wide areas in the minimum times given above would depend on many other factors peculiar to the specific situation, including Western tactics, the ECM environment, and prevailing atmospheric conditions.

E. SOVIET CAPABILITIES TO WITHSTAND LARGE SCALE DAMAGE FROM NUCLEAR RETALIATORY ATTACKS

1. Effects on Central Authority of a Heavy Scale of Damage

(a) While "large scale damage" could include a wide range of numbers of targets and cities, for the purposes of this discussion one large scale attack can be defined as an attack, which, say, involved 85 of the largest and most important Soviet cities, in addition to attacks on military targets. These cities, in 1958, included approximately the following proportions of Soviet strengths: 72 of 79 identified primary and secondary government control centers; 40 percent of the urban population; 40 per cent of railroad facilities; 50 per cent of all important inland port facilities; 50 per cent of steel production capacity; 65 per cent of POL refinery capacity and storage; 25 per cent of non refinery POL storage.* Nuclear attacks resulting in 80-95 per cent destruction of these 85 cities, in addition to the virtual elimination of their

* Figures given in this paragraph are from the January 1959 Target Data Inventory. We recognize that changes will occur between now and mid-1963. For purposes of this exercise, we assume that these changes will not significantly affect the discussion in the following paragraphs.

economic production, would cause 30 to 36 million immediate urban casualties, assuming that the cities had not been evacuated. Fall-out could cause an equal number of casualties in other cities and rural areas. Casualties would probably include a large part of the upper strata of Soviet society, including Communist Party membership, and a large proportion of the skilled manpower.

(b) Given damage and casualties on such a scale, we believe that a central political authority would be unable, for some interval, to coordinate and control the national war effort. The central authority would almost certainly be cut off from large areas of the country, and receipt of information and transmittal of orders would be severely curtailed for some time. Re-establishment of effective control would be exceedingly difficult. In many areas the only authority would be military and to the extent that a military command structure remained intact it would probably provide the framework for reestablishment of central authority.

(c) We are unable to estimate what scale of damage less than that described in paragraph (a) would still permit a central authority to function effectively. It is likely that

the central leadership will have made arrangements as fully as it can to insure its survival. It is likely also to have planned for the use of emergency communication and control facilities, at least in key areas of the country. The history and traditions of the Communist Party suggest that if a core of the higher leadership survives it will act rapidly, with discipline and effective improvisation to maintain control of events. It is conceivable therefore that despite very large casualties, severe damage to industrial complexes, communications, and transportation facilities, a central authority would still be able to reassert itself and initiate recovery.

(d) Insofar as a surviving central authority was able to take decisions as to whether the war should be continued, we do not believe that its action could be anticipated. The Soviet leaders would act primarily in the light of what they thought offered the best chance of insuring the survival of themselves as a power group and of their movement. A key factor would be the Soviet evaluation of the USSR's relative capabilities, particularly military, compared with those of the US and its Allies. Their decision either to fight on or to negotiate an end to hostilities would also depend on their judgment as to the condition and policies of the enemy and as

to possible challenges to Soviet power within the USSR. We believe they would not surrender themselves under conditions which would result in their extinction as individuals and as a party organization. In light of their doctrine regarding the probability of a protracted struggle with residual forces, and of their continuing programs to maintain massive conventional forces and mobilization capacity, we believe it should be assumed that the Soviet leaders would try to continue the war.

2. Factors Affecting Ability of the Regime to Continue Hostilities

(a) Civilian will-to-resist. Even if alerted, the USSR would suffer very large civilian casualties. Word of heavy population losses and physical destruction probably would cause panic, fear and apathy, but it is likely that a will-to-resist could be reactivated. The general hardiness of Soviet citizens, as well as their ability to improvise and their long subjection to a relatively low standard of living, would be helpful in surmounting physical and morale problems. The tradition of cohesiveness and conformity in Soviet society would also act as a stabilizing influence.

(b) Morale of the armed forces. The effects on the morale of the Soviet armed forces of an extensive nuclear attack cannot be estimated. The immediate effects would derive largely from attacks on the forces themselves. The initial nuclear attacks would probably not have a sustained adverse effect on the morale of Soviet units not subjected to attack; the morale of certain units with important missions might even be increased in the early stages. This might be particularly true of Soviet forces in the European forward area and border areas of the USSR, PVO forces actively engaged in defending the homeland, and certain elements of the Soviet Navy. Morale of the Soviet long-range nuclear striking forces would probably depend upon the severity of their losses and the success of their operations. It must be assumed that Soviet planners will have taken such advance steps as are possible in order to be able to conduct effective military operations even after an extensive nuclear attack. It is estimated that ground force line divisions which did not receive more than about 50 per cent immediate casualties could operate effectively, to the extent of their reduced physical capability, within a relatively short period. In such units or in large formations, the survival of sufficient command

personnel and necessary communications and control channels would be essential conditions. The cumulative effect on troop morale of reports of widespread devastation and loss of life in the USSR cannot be estimated. However, we believe that Soviet training and indoctrination and the quality of military leadership is such that the morale of the armed forces, by itself, would not be a significantly limiting factor on the Soviet capability to conduct military operations with residual forces.

(c) Economic vulnerability. The relative concentration of industry, agriculture and transport in the Western areas of the USSR renders the economy subject to serious disruption from large-scale nuclear attack. The vulnerability of Soviet industry probably will not be significantly reduced by the investment in industry in Siberia provided in the current Seven-Year Plan. The most vulnerable factors in the economy are (1) the concentration in relatively few plants and cities of the known production facilities for aircraft, missiles, atomic energy, submarines, and liquid fuels, as well as economic controls, telecommunications, and transportation facilities, and (2) the concentration in the large urban centers of industrial facilities in general and skilled manpower of all types.

3. Conclusions. A large scale nuclear attack would seriously impair and might destroy the Soviet capability to carry on an effective war effort. There is, however, no particular level of physical damage which can be calculated as likely to bring about a Soviet decision to discontinue hostilities. It should be assumed for the purposes of this exercise, that so long as some significant military capability remained, the Soviet leaders would continue the war effort.

F. SOVIET NUCLEAR WEAPONS IN MID-1963

(Submitted through Restricted Data channels under separate cover).

G. US WARNING CAPABILITIES IN MID-1963

(submitted through Special Intelligence channels under separate cover).

RESTRICTED DATA
AS DEFINED BY ATOMIC ENERGY ACT OF 1954

TOP SECRET
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RESTRICTED DATA

NSS Declassification Review [EO 13526]
DECLASSIFY IN FULL
by Mary Ronan on 11/7/2012

(4)

ANNEX C

OBJECTIVES, CONCEPTS AND DAMAGE CRITERIA FOR THE DEVELOPMENT OF TARGET SYSTEMS

4 May 1959

MEMORANDUM

Subject: Objectives, Concepts and Damage Criteria for the Development of Target Systems

1. Objectives

In general war with the USSR, the basic military objective of the United States is the defeat of the Soviet Bloc to a degree which will assure the accomplishment of the U.S. National Objective to preserve the security of the United States and its fundamental values and institutions. This includes the following objectives:

a. To prevail, and survive as a nation capable of controlling its own destiny.

b. To reduce, by military and other measures, the capabilities of the USSR and Communist China to the point where they have lost their will and ability to wage war against the United States and its Allies.

c. To render ineffective the control structure by which the enemy regimes have been able to exert ideological and disciplinary authority over their own peoples and over individual citizens or groups of citizens in other countries.

d. To preserve and retain as many of our Allies as possible.

e. So far as consistent with the above objectives, to avoid destruction and casualties in all countries not involved in the war.

f. To retain in the United States a capacity for quick recovery from nuclear assault.

Policy Guidance

*g. The United States will utilize all requisite forces against selected targets in the USSR--and as necessary in Communist China, European Bloc and non-European Bloc countries--to attain the above objectives. Military targets in Bloc countries other than the USSR and Communist China will be attacked as necessary. (NOTE: It is assumed that the peoples of the Bloc countries other than the USSR and Communist China are not responsible for the acts of their governments and accordingly so far as consistent with military objectives military action against these countries should avoid non-military destruction and casualties.)

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*Paragraph g. contains the controlling policy guidance with respect to military action to attain the foregoing objectives.

DEPARTMENT OF ENERGY DECLASSIFICATION REVIEW
1st REVIEW-DATE: [illegible]
AUTHORITY: DC DD
NAME: [illegible]
2nd REVIEW-DATE: 5/17/07
AUTHORITY: DD
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DETERMINATION [CIRCLE NUMBER(S)]
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2. CLASSIFICATION CHANGED TO: NSI
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7. OTHER (SPECIFY):

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Authority NLE 2012-73 #4
By MMK NLDDE Date 11/16/13

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h. If, in the course of the hostilities, an enemy country asks the United States for peace terms, the United States should not accept any terms unless they remove the threat to U.S. security posed by such country.

2. Concept of General War

A general war would consist of two phases; an initial phase of comparatively short duration, and a subsequent phase of indeterminate duration. The initial phase would be characterized by an intensive exchange of atomic blows and the initiation of operations and deployments by Army, Naval and Air Force forces designed to achieve strategic advantage. During this period, the U.S. atomic capability would be exploited fully, to the end that enemy military losses and the loss of the war-making capacity directly supporting enemy forces would be such as to either (a) bring about his capitulation or (b) provide a margin of relative advantage to the U.S. and its Allies sufficient to assure victory in the subsequent phase of operations. This subsequent phase would be a continuation of the initial phase operations, probably at reduced atomic intensity, and follow-up offensive operations to achieve victory and attain Allied war objectives. The ultimate strategy adopted, as well as the duration and outcome of this subsequent phase, will depend largely on the relative advantage achieved in the initial phase and the remaining relative capabilities.

3. Initial Phase of General War

Plans will be developed for attack of each of the following target systems:

a. Military Target System

Plans will be formulated to carry out the following primary initial phase undertakings in order of importance, but not necessarily in order of accomplishment:

(1) First priority will be accorded to the reduction of enemy atomic delivery capabilities and military controls to the extent necessary to eliminate the threat of atomic attacks on U.S. and Allied territories and forces.

(2) Second priority will be accorded to the retardation or halting of the operations of enemy land, naval, and air forces to prevent overrunning of large areas of U.S. or Allied territory, and to insure the maintenance of control of essential sea areas and the protection of vital sea communications.

(3) Third priority will be accorded to denying the use of principal enemy war-supporting resources which can immediately and directly contribute to the enemy's capability to conduct initial military operations.

b. Urban-Industrial Target System

Priority will be accorded to the destruction of major urban-industrial centers and of primary government controls within the USSR and China to the extent necessary

to destroy or neutralize the capability of the USSR and China to carry on the war and to render ineffective the Communist control structure.

c. Optimum-Mix Target System

Plans will be formulated to carry out the following primary initial phase undertakings in order of importance, but not necessarily in order of accomplishment:

(1) First priority will be accorded to the destruction of the enemy nuclear delivery capabilities and military controls concurrently with the destruction of major urban-industrial complexes and primary government controls within the USSR and China to the extent necessary to eliminate the threat of nuclear attacks on U.S. and Allied forces and territories and to neutralize the capability of the USSR and China to carry on the war.

(2) Second priority will be accorded to the retardation or halting of the operations of enemy land, naval, and air forces to prevent overrunning of large areas of U.S. or Allied territory and to insure the maintenance of control of essential sea areas and the protection of vital sea communications.

(3) Third priority will be accorded to denying the use of principal enemy war-supporting resources which can immediately and directly contribute to the enemy's capability to conduct initial military operations.

4. Subsequent Phase of General War

Subsequent to successful completion of the above undertakings, atomic operations, as directed by the Joint Chiefs of Staff, will be concentrated on selective destruction of remaining enemy war-supporting resources and the conduct of follow-up land, sea, and air offensive operations to achieve the military objectives stated in paragraph 1., above.

5. Concept of Employment

The employment of atomic weapons will be designed to accomplish national objectives with the maximum over-all effectiveness tempered, as feasible by provision for: (1) adequate but not excessive weight of attack, (2) retention of adequate reserves of weapons, (3) avoidance of preventable waste of weapons and weapons systems, (4) constraints outlined in paragraph 10, Atomic Annex, JSEP, which apply under all conditions. Each of the three targeting concepts shall be designed for employment in the initial phase of general war characterized by an intensive exchange of atomic blows in which a premium will be placed on speed and decisiveness of attack. For each system the employment of strategic forces shall be in accordance with the following concept. (NOTE: The requirements for attack of air defense forces and bases, except for major air defense controls, will be considered separately.)

a. Military System

The earliest possible reduction of the enemy's atomic delivery capability shall be of paramount importance. Accordingly, attacks will be programmed to deny the enemy the use of his air base structure and atomic delivery systems. Concurrently the enemy's will and ability to wage general war must be reduced by attacking his military controls, atomic weapon sites and critical interdiction targets. Likewise the enemy must be denied the use of principal war-supporting resources which make an immediate and direct contribution to his ability to conduct initial military operations.

b. Urban-Industrial System

Nuclear attacks against urban-industrial complexes will be designed to destroy or neutralize government control centers and major industrial resources, for the purpose of destroying the Sino-Soviet will and ability to continue the war.

c. Optimum Mix System

The earliest possible reduction of the enemy's atomic delivery capability will be given primary consideration. Beyond this first consideration, attacks shall be designed to paralyze the nation and to destroy the enemy's will and ability to fight. Accordingly, attacks of the initial forces will be programmed concurrently against major government and military control centers and major industrial complexes.

6. Targets - Military Target System

A list of the types of targets which will be programmed for attack on the military target system in the initial phase of a general war is set forth below:

a. Atomic Capable Forces

(1) Bomber forces and bases (including Naval Air).

(a) Primary airfields, headquarters, and control centers.

(b) Primary staging airfields.

(c) Alternate bomber airfields.

(d) Forward/interior recovery airfields.

(2) ICBM and IRBM forces and missile launch facilities.

(3) Submarine forces and bases.

b. Primary military control centers (including Air Defense).

c. Atomic weapons storage sites.

d. Critical interdiction targets.

e. Those of the following critical war-supporting resources which are of primary importance and the denial of which will cause a significant and immediate reduction in the effectiveness of enemy military operations during the initial phase of general war:

(1) Atomic weapons production.

(2) Liquid fuels storage.

(3) Naval bases.

(4) Primary logistic support installations plus those now classified as of secondary importance to air operations but which provide immediate essential support to such operations.

7. Targets - Urban-Industrial Target System

a. Urban-industrial complexes containing primary and secondary government controls.

b. Urban-industrial complexes possessing a major or critical industrial capacity.

c. Key transportation centers.

8. Targets - Optimum Mix Target System

a. Atomic capable forces.

(1) Bomber forces and bases (including Naval Air).

(a) Primary airfields, headquarters, and control centers.

(b) Primary staging airfields.

(c) Alternate bomber airfields.

(d) Forward/interior recovery airfields.

(2) ICBM and IRBM forces and missile launch facilities.

(3) Submarine forces in port and bases.

b. Primary military control centers (including Air Defense).

c. Atomic weapons storage sites.

d. Critical interdiction targets and key transportation centers.

e. Urban-industrial complexes containing primary and secondary government control centers.

f. Urban-industrial complexes possessing a major or critical industrial capacity.

g. Those of the following critical war-supporting resources classified as of primary importance and the denial of which will cause significant and immediate reduction in the effectiveness of enemy military operations during the initial phase, whether or not located in major urban-industrial complexes.

(1) Atomic weapons production.

(2) Liquid fuels storage.

(3) Naval bases.

(4) Primary logistics support installations plus those now classified as of secondary importance to air operations, but which provide immediate essential support to such operations.

9. Targets for the Subsequent Phase

a. Enemy residual nuclear delivery forces.

b. Enemy military forces not included in initial phase attacks, and installations which provide direct support to such forces.

c. Those residual critical elements of enemy war-supporting resources whose destruction, if necessary, will further reduce the enemy's capability to conduct military operations. Principal elements are oil refineries, major concentrations of oil stocks, submarine construction facilities, and production facilities for air frames, aircraft engines, missiles, and steel.

10. Damage Criteria for the Inital Phase of General War

a. Ninety per cent probability of severe damage to a sufficient portion of the critical elements to deny the enemy effective use of the following:

(1) Atomic capable forces (including Naval Air).

(a) Bomber forces and bases.

1. Primary airfields, headquarters, and control centers.

2. Primary staging airfields.

3. Alternate bomber airfields.

4. Forward/interior recovery airfields.

(2) ICBM and IRBM forces and missile launch facilities.

(3) Submarine forces and bases.

(4) Primary military control centers.

(5) Atomic weapons storage sites.

(6) Naval bases.

b. Ninety per cent probability of lesser but significant damage to the critical elements of the following:

(1) Critical interdiction targets.

(2) Critical war-supporting resources.

(a) Atomic weapons production.

(b) Liquid fuels storage.

(c) Primary logistic support installations plus those now classified as of secondary importance to air operations but which provide immediate essential support to such operations.

(3) All urban-industrial targets.

/s/ C. L. Granger
C. L. GRANGER
Colonel, USMC
Chief of Staff

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ANNEX D

DERIVATION OF FACTORS

A. AIRCRAFT

Surprise Condition - [redacted]

1. In Commission Rate. The fraction of the force ready for use at any given time.

a. Airborne Alert Force, B-52. Early estimates of the results of the B-52 Airborne Alert Force tests, HEADSTART, indicate that an airborne alert is feasible but at some expense. For this study it was assumed that the alert force will be [redacted] of the B-52 force. [redacted]

(25)(x5)

b. Ground Alert Force, B-52. It was assumed that an additional force of B-52 aircraft would be placed on a ground alert to re-enforce the airborne alert force and would bring the combined alert force to [redacted] of the B-52 force strength. This force was assumed to be 100 per cent in commission. Again, ground spares were assumed used to insure a 100 per cent launch.

(25)(x5)

c. Follow-on or Remaining Aircraft, B-52. This force consists of the remaining [redacted] of the total force [redacted] The airborne alert force, ground alert force rates, and the follow-on rate combined produces an over-all [redacted] in commission rate which is the average of the SAC B-52 force today (this factor furnished by the U.S. Air Force).

(25)(x5)

d. Ground Alert Force, B-47. An assumption was also made that during this time period the missile threat would require a ground alert force in the medium bomber force of approximately one-third. This force amounts to (25)(x5) [redacted] This force is assumed to be 100 per cent in commission.

e. Follow-on or Remaining Aircraft, B-47. The (25)(x5) remaining [redacted] aircraft [redacted] are assumed to be 70 per cent in commission [redacted] These aircraft are not loaded with weapons and would likely be evacuated. The surviving aircraft would be recovered, loaded, and launched at the earliest practicable time.

f. Ground Alert Force, B-58. This force [redacted] was assumed to be on a ground alert and 100 per cent in commission.

g. Follow-on or Remaining Aircraft, B-58. The [redacted] aircraft per B-58 wing are assumed to be [redacted] in commission [redacted] aircraft per wing), and would be evacuated. The surviving aircraft would be loaded and launched after recovery.

2. Surprise Attack Survival Rate. The fraction of the ready force surviving a surprise attack.

a. Airborne Alert Force, B-52. Since this force is airborne it is assumed to have survived the surprise attack 100 per cent.

b. Ground Alert Force, B-52, B-47, B-58. Actual experience in Strategic Air Command assures the launching (25)(x5) of these forces [redacted] An assumed five per cent ground abort rate, derived from information provided by USAF, degraded this over-all rate [redacted] per cent.

c. Follow-on or Remaining Aircraft, B-52, B-47, B-58.

(25)(x5) The rate of [redacted] assumed for all three types of aircraft has been estimated based on indicated survival rates in war games. This takes into consideration evacuation, dispersal and the loss of the majority of the SAC bases in the attack.

3. Reliability Rate. The fraction of the surviving force launched successfully and penetrating to line of enemy resistance.

(25)(x5) a. Airborne Alert, B-52. The [redacted] reliability assumed for this force has not yet been achieved in the airborne alert force tests but is one based on projected improvement by 1963 and the elimination of the peace time flying safety aspect. NOTE: This assumes that plans would provide for additional refueling for those airborne aircraft unable to proceed to target at H-hour because of fuel shortage and which would otherwise be ineffective.

(25)(x5) b. Ground Alert and Follow-on or Remaining Aircraft, B-52. The assumed [redacted] reliability factor is derived from factors received from USAF with projected improvement. The [redacted] reduction is based on air and ground abort rates plus air refueling abort rates.

(25)(x5) c. Ground Alert and Follow-on or Remaining Aircraft, B-47. The assumed [redacted] reliability factor for B-47's is derived from USAF provided factors. The [redacted] consists of the ground and air abort rate plus an air refueling abort rate. The B-47 force is handicapped in airborne refueling with the KC-97 which is a comparatively low altitude aircraft and is occasionally hampered by weather.

d. Ground Alert and Follow-on or Remaining Aircraft, B-58. The assumed [redacted] reliability factor for B-58's was derived from factors provided by USAF with a small projected improvement by 1963.

4. Enemy Defense Suppression Rate. The fraction of the launched force programmed against the primary target system after deduction of the percentage necessary to be programmed against Air Defense targets to enable the force to penetrate.

a. Airborne Alert and Ground Alert Force, B-52, B-47, B-58. This rate will vary depending upon the number of defense targets to be attacked for penetration to a given target system. In the case of the Military Target System, (25)(x5) it is the per cent of the launched force [redacted] programmed against the primary target list. The remainder of the launched force attack defense targets. (In the case of all three target systems the defense targets are [redacted] (25)(x5)

b. Follow-on or Remaining Aircraft, B-52, B-47, B-58. The (25)(x5) [redacted] rate assumes that only [redacted] of the follow-on or remaining aircraft would be programmed to attack Air Defense targets, since the forces ahead of them would have generally cleared corridors of air defenses.

5. Enemy Resistance Survival Rate. The fraction of the launched force penetrating the line of enemy resistance and surviving to the bomb release line.

a. Airborne Alert Force B-52, Ground Alert and Follow-on or Remaining Aircraft, B-52, B-47, B-58. This factor is one that should be considered as the mid-point of a range rather than a set figure, and this range might vary widely depending upon the tactics utilized in the attack, the defenses of the target, and the type of weapon used - bomb or ASM. Based on previous war game experience a range from (25)(x5) [redacted] For

purposes of this study the specific figure of [redacted] was selected as the mid-point of the developed range. NOTE: A small change in this factor makes a sizeable difference in the force required.

6. Delivery Effectiveness Rate. The fraction of the surviving force delivering effective weapons.

a. Airborne Alert Force, B-52, Ground Alert Force and Follow-on or Remaining Aircraft, B-52, B-47, B-58. This factor was assumed to be [redacted] reduction being based on the weapon dud rate and a small gross error bombing rate.

7. Weapons per Carrier Rate. The average number of weapons carried per vehicle.

a. Airborne Alert Force, B-52. The airborne alert B-52's are assumed to be loaded with an average of [redacted] bombs and ASM's. This number is based upon reasonable aircraft capability, the requirements for carrying different sizes and weights of weapons, hardness of targets, tactics, and the flexibility necessary for the commander in applying his force.

b. Ground Alert, B-52. It is assumed that ground alert aircraft which subsequently may be used to supplement the airborne alert will carry the same load or an average of four weapons.

c. Follow-on or Remaining Aircraft, B-52. It was assumed that these aircraft would be loaded with an average [redacted] (25)(x5). This loading is believed optimum considering the difficulty of loading aircraft after an attack and the problems of locating recover bases and obtaining weapons.

d. Ground Alert, B-47. Based upon estimates of USAF (SAC), it was assumed that for the [redacted] (25)(x5) ground alert force, B-47's would be loaded with an average of [redacted]

e. Follow-on or Remaining Aircraft, B-47. It was assumed that these B-47 aircraft would be loaded with [redacted] (25)(x5) [redacted]. This loading is believed optimum considering the urgent timing after an attack, the difficulty of loading and availability of weapons.

f. Ground Alert and Follow-on Aircraft, B-58. The B-58 is designed to carry only [redacted] (25)(x5) in present programs, under any conditions.

8. Restrike Availability Rate. The fraction of the aircraft returning to a restrike base in forward areas. The factors established for all aircraft were based on previous war game experience and assumed some additional attrition would occur after last target.

Twenty-Four Hour Alert Condition (Affords [redacted] (25)(x5) Tactical Warning)

1. In Commission Rate

a. Airborne Alert Force, B-52. It was assumed that the alert force will be [redacted] (25)(x5) of the B-52 force. At the beginning of the alert it was assumed that the force is airborne and that ground spare aircraft were used to assure that the full [redacted] was in the air, which gives this force a 100 per cent in commission rate (approximately [redacted]).

b. Ground Alert Force, B-52. It was assumed that after 24 hours of alert [redacted] (25)(x5) of the force [redacted] per wing) would be in commission, loaded and on alert. [redacted] (25)(x5) Thus, all ground alert force are assumed 100 per cent combat capable.

c. Follow-on or Remaining Aircraft, B-52. It was (25)(x5) assumed that approximately [redacted] of the remaining aircraft per wing would be in commission or sufficiently flyable for evacuation and later would be readied and launched.

d. Ground Alert Force, B-47. It was assumed that (25)(x5) after 24 hours of alert, [redacted] of the B-47 force [redacted] would be in commission, loaded and on alert. One-third of the force or [redacted] (the normal ground alert) would be loaded with an average of [redacted] per aircraft. The remaining [redacted] aircraft per wing would be loaded with [redacted] per aircraft. Thus, all ground alert force aircraft are assumed 100 per cent combat capable.

e. Follow-on or Remaining Aircraft, B-47. It was (25)(x5) assumed that approximately [redacted] of the remaining aircraft per wing would be in commission or sufficiently flyable for evacuation and later would be readied and launched.

f. Ground Alert Force, B-58. It was assumed that (25)(x5) after 24 hours of alert [redacted] of the B-58 force [redacted] would be in commission, loaded and on alert. All [redacted] of these aircraft per wing would be loaded (25)(x5) with [redacted] per aircraft. Thus, all ground alert force aircraft are assumed 100 per cent combat capable.

g. Follow-on or Remaining Aircraft, B-58. It was (25)(x5) assumed that approximately [redacted] of the remaining aircraft per wing would be in commission or sufficiently flyable for evacuation and later would be readied and launched.

2. Surprise Attack Survival Rate

a. Airborne Alert Force, B-52. This force is assumed to be airborne during the alert period and the attack period and 100 per cent survived [redacted].

b. Ground Alert Force, B-52. This factor was assumed (25)(x5) to be [redacted] of the force. The [redacted] reduction from the Survival Rate under surprise conditions is based primarily on the larger number of aircraft on the alert requiring a longer time to launch which would permit a small percentage of aircraft to be caught on the ground.

c. Follow-on or Remaining Aircraft, B-52. This rate (25)(x5) is assumed to be [redacted]. Total aircraft at risk was [redacted] of the force [redacted] of which [redacted] were out of commission [redacted]

d. Ground Alert Force, B-47. This factor was assumed (25)(x5) to be [redacted] of the force. The [redacted] reduction from the Survival Rate under conditions of surprise is based primarily on the larger number of aircraft on the alert requiring a longer time to launch which would permit a small percentage of aircraft to be caught on the ground.

e. Follow-on or Remaining Aircraft, B-47. This rate was assumed to be [redacted]. The total at risk was [redacted] (25)(x5) [redacted] of the force, or [redacted] of which [redacted] were out of commission ([redacted] per wing).

f. Ground Alert Force, B-58. This factor was assumed (25)(x5) to be [redacted] of the force. The [redacted] reduction from the Survival Rate under conditions of surprise is based primarily on the larger number of aircraft on the alert requiring a longer time to launch which would permit a small percentage of aircraft to be caught on the ground.

g. Follow-on or Remaining Aircraft, B-58. This rate (25)(x5) was assumed to be [redacted]. The total at risk was [redacted]

(25)(x5) [redacted] of the force, or [redacted], of which [redacted] were out of commission [redacted].

3. Reliability Rate. For all types of aircraft and under all conditions, these rates are assumed to be the same as (25)(x5) those established under the conditions of surprise; [redacted] for Airborne Alert B-52's; [redacted] for the Ground Alert and Follow-on Aircraft, B-52; [redacted] for the Ground Alert and Follow-on Aircraft, B-47; [redacted] for the Ground Alert and Follow-on Aircraft, B-58.

4. Enemy Defense Suppression Rate

a. Airborne Alert and Ground Alert Force, B-52, B-47, B-58. This rate will vary depending upon the number of defense targets to be attacked for penetration to a given target system. In the case of the Military Target System, (25)(x5) it is the per cent of the launched force [redacted] programmed against the primary target list. The remainder of the launched force attack defense targets. (In the case of all three target systems the defense targets are (25)(x5) [redacted]

b. Follow-on or Remaining Aircraft, B-52, B-47, B-58. This rate was assumed to be [redacted] and is [redacted] higher than the rate under conditions of surprise. This factor was raised since this force is so small and follows a much greater force than under surprise conditions. Also, the air defenses in the area of attack are assumed to be generally reduced in effectiveness.

5. The Enemy Resistance Survival Rates, Delivery Effectiveness Rates, and Weapons per Carrier Rates are the same under the conditions of surprise or the conditions of 24 hour alert.

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6. Restrike Availability Rate. The factors established for all aircraft are based on previous war game experience and assumed some additional attrition would occur after the last target.

B. MISSILES

Factors for Both Surprise and Alert

1. In Commission Rate. The fraction of the force ready for use at any given time.

a. Atlas, Unhardened, Radio Inertial. The rate (25)(x5) of [redacted] was furnished by the USAF and is a result of [redacted] per squadron being on launchers ready for launch and [redacted] in maintenance. The Atlas, Radio Inertial Missile Squadron will be capable of launching [redacted]

(25)(x5) b. Atlas, Hardened [redacted], All Inertial. The in commission rate of [redacted] was furnished by the USAF and is the result of [redacted] per squadron placed on launchers ready for launch and [redacted] in maintenance. The Atlas, All Inertial Missile Squadron will be capable of salvoing [redacted]

c. Atlas, Hardened 100 PSI, All Inertial. The (25)(x5) in commission rate of [redacted] is furnished by the USAF and for the same reasons as above. The All Inertial Missile Squadrons will be capable of salvo of [redacted]

(25)(x5) d. Titan, Hardened [redacted], Radio Inertial. The in commission rate of [redacted] was furnished by USAF

and for the same reasons, [redacted] on launchers and [redacted] in maintenance. The Titan Radio Inertial Missile Squadron will be capable of launching [redacted]

(25)(x5)

(25)(x5) e. Titan, Hardened [redacted], All Inertial. The in commission rate of [redacted] is furnished by the USAF. [redacted] on launchers and [redacted] in maintenance per squadron.) The Titan All Inertial Missile Squadrons will be capable of salvo of [redacted]

(25)(x5) f. Minuteman, Hardened [redacted], All Inertial. The assumed in commission rate of [redacted] is based on relative ease of maintaining a solid propellant missile. This rate also reflects a slight improvement over the USAF provided rate.

(25)(x5) g. Polaris, On Line, Surprise. The rate of [redacted] was assumed and considered that each Polaris submarine would probably have [redacted] The On Line submarines [redacted]

(25)(x5) h. Polaris, Forward Base, Surprise. The in commission rate of [redacted] was assumed, considering each Polaris submarine will have [redacted]

(25)(x5)

1. Polaris, On Line, 24 Hour Alert. This rate again was assumed to be [redacted]

2. Surprise Attack Survival Rate[1/]

a. Atlas, Unhardened, Radio Inertial. The survival rate of [redacted] is assumed based on their relatively slow launch capabilities and on the unhardened condition of these missiles.

b. Atlas and Titan, Minuteman, Hardened to [redacted] The 100 per cent survival rate is assumed as a result of the rapid launch capability and hardened condition of these missiles.

c. Polaris, On Line, Surprise and 24 Hour Alert. This rate of 100 per cent is assumed and based on the Polaris submarines being submerged and on station ready to fire.

d. Polaris, Forward Base, Surprise. This survival rate of [redacted] is assumed and is based on the relatively vulnerable position of these submarines; along side the tender and in training exercises.

3. System Reliability Rate, Inflight Reliability Rate and Delivery Effectiveness Rates (Atlas, Titan, Minuteman)

a. These rates were furnished by USAF and are based on launch or ground abort rates, air abort probabilities, gross error probabilities and warhead failure or dud rates.

1/ Survival Rate in this case refers only to the degree of tactical warning provided by the Terms of Reference.

4. System Reliability Rate, Inflight Reliability Rate and Delivery Effectiveness Rates (Polaris)

a. These rates were assumed and are based on launch or ground abort rate, air abort probabilities, gross error probabilities and warhead failure or dud rates.

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APPENDIX 1 to ANNEX D

APPLICATION OF FACTORS

1. The development of required force structures for any given target list was based on the application of factors derived for each weapon delivery system in order to establish the requirement for that particular system. The manner in which those factors were applied is demonstrated below using throughout the B-52 airborne alert system for aircraft and the Minuteman for missiles, for the "Surprise" condition, as examples.

2. Aircraft

a. Multiply factors for In Commission (1), Surprise Attack Survivability (2), Reliability (3), Enemy Resistance Survival (5), and Delivery Effectiveness (6), to arrive at the over-all value for any system. (The Enemy Defense Suppression Rate is established after the fact and is not used in the development of force requirements, since the weapons and aircraft required include those used in defense suppression.)

(25)(x5)

Example:

b. [redacted]

Example:

[redacted]

1/ In cases where a given whole number yielded slightly under 90% and the next higher number yielded substantially over 90% the lesser number was actually used.

(25)(x5)

c. [redacted]

d. [redacted]

e. [redacted]

f. For comparison, forces were also developed by simple straight line application of the derived factors. These lesser requirements will provide an average assurance [redacted] that a weapon will arrive at each BRL. In this case the first step is to

(25)(x5)

apply the value for any category to the weapons per carrier rate and the number of programmed aircraft to determine the number of BRL weapons delivered.

(25)(x5) Example: [redacted]

g. The total weapons that can be delivered by the programmed force is found to be 771 and a ratio for each category to the total requirement is thus established.

(25)(x5) Example: [redacted]

h. By the method described in 2e above, the requirement for weapons and aircraft for each category is determined.

(25)(x5) Example: [redacted]

i. To determine the degree of assurance with which weapons will be delivered at BRL's first determine the ratio between weapons carried in these aircraft to number of targets.

Example: [redacted]

(25)(x5) j. [redacted]

3. Missiles

a. Missile force requirements were based on applying the whole number of missiles which resulted in the closest to 90% probability of at least one weapon arriving at each BRL.

(25)(x5) Example: [redacted]