UNITED STATES NAVAL WAR COLLEGE

SCHOOL OF NAVAL WARFARE

THESIS

SHOULD THE UNITED STATES DEPLOY AN ANTI-BALLISTIC MISSILE?

BY

K. M. SANDON

COMMANDER, U.S. NAVY

SHOULD THE UNITED STATES DEPLOY AN ANTI-BALLISTIC MISSILE?

by

K.M. Sandon

Commander, U.S. Navy

1 April 1967

ABSTRACT OF

SHOULD THE UNITED STATES DEPLOY AN

ANTI-BALLISTIC MISSILE?

The question posed in the title of this thesis is one of the most demanding and explosive queries of the times. An effort was made to reduce the nebulous arena of indecision on the subject of anti-ballistic missile deployment from one of distortion to one of definition. The investigation was directed toward the most influential factors which surround this issue: military, economic, political, and psychological.

With the generally accepted hypothesis that the United States should possess an active anti-ballistic missile defense, an analysis of available information was conducted. The research pursued the objective of determining whether there is reasonable affirmative evidence to satisfy a decision to deploy an anti-ballistic missile system now, or whether a preponderance of actual capabilities should exist prior to adopting an endorsement of deployment. The decision to deploy today would be supplemented by the employment of the "building block" concept for improving, updating, and incorporating future developments.

The resulting patterns in each of the four areas examined were a reenforcement of the decision to deploy a total anti-ballistic missile system on a programed time base without delay.

TABLE OF CONTENTS

INTRODUCTION

Weaponry advances as a responsive requirement: an advanced offensive weapons system induces the development of a defensive countermeasure. Through this process, a parity between offensive and defensive systems may be approached; however, new developments and technological advancements shift the near balance and the cycle is continued. This system of reaction to an action has resulted in an arms race which has become more devastating with each cycle.

The development of an anti-ballistic missile, as an active defense against an intercontinental-ballistic missile, is a responsive reaction. Most interested persons agree that the United States should have an active anti-ballistic missile capability. However, there is considerable disagreement as to whether the system should be defensive or offensive in nature and whether it should be deployed now or delayed in favor of a more advanced system.

An examination of four relative factors--military, economic, political, and psychological--has been pursued in this paper in order to determine an answer to the question of anti-ballistic missile deployment. Is it possible that such an investigation can result in a positive recommended course of action? From the preponderance of evidence resulting from the consideration of the four factors an attempt has been made to formulate pertinent conclusions and sound recommendations.

SHOULD THE UNITED STATES DEPLOY AN ANTI-BALLISTIC MISSILE?

CHAPTER I

UNITED STATES DEVELOPMENT OF AN ANTI-BALLISTIC MISSILE: A REACTION PROCESS

Man's desire for self-preservation in society dates back in history to the first thrown stone, followed by the catapulted stone, the propelled stone, the guided stone and now a destructive force which could return advanced civilization to the stone age. One nation's reaction to that of another has created a monster--the arms race, a race which finds its impetus in the deployment of every new weapons system. Probable escalation associated with a new weapons system must be thoroughly examined prior to deployment, in order to determine the possible effects of the deployment on the balance of power. Therefore, the anti-ballistic missile must be subjected to such an examination.

Action and Reaction. The United States delivery of the atomic bombs on Hiroshima and Nagasaki in August 1945 initiated a new era in warfare. The effects were to have a tremendous impact upon the international policies and actions of nation states. As stated by Donald G. Brennan:

> The simple problem of national survival, in its various senses, is sufficient to indicate the

> character of the enormously complex interaction among armament policy, armament-in-being, and national goals and purposes. Of course, the present and projected armament and national goals of other--or, rather, our beliefs concerning them--are components of this interaction.[1]

Positive responsive action by the Soviet Union to the United States' capability in atomic technology was inevitable. In that the United States had employed atomic weapons to achieve national objectives, the Soviets had sufficient reason to pursue with crash efforts the development of an atomic weapon. They established as a primary goal the absolute requirement to overcome the atomic monopoly of the United States. As stated by Nels A. Parson, Jr., "The Soviet Union emphasized immediate deployment of operational systems and ruthlessly exploited German technology to accomplish this goal."[2]

During the 18 months following Japan's signing of the surrender terms on 2 September 1945, the United States had pursued a policy of disarmament while continuing the development of atomic weapons. This disarmament policy was the subject of much study both in and out of the military services. There were good and sufficient reasons to have concern; among these were the Russian supported actions in the Middle East in 1947. John W. Spanier cited the British

---

[1]Donald G. Brennan, ed., Arms Control, Disarmament, and National Security (New York: Braziller, 1961), p. 20.

[2]Nels A. Parson, Jr., Missiles and the Revolution in Warfare (Cambridge: Harvard University Press, 1962), p. 35.

reactions to these crises in his book, American Foreign Policy since World War II, as follows:

> . . . on the afternoon of February 21, 1947, the First Secretary of the British Embassy in Washington visited the State Department and handed American officials two notes from His Majesty's Government. One concerning Greece, the other Turkey. In effect, they both stated the same thing: that Britain could no longer meet its traditional responsibilities in those two countries. Since both were on the verge of collapse, the import of the British notes was clear: that a Russian breakthrough could be prevented only by an all-out American commitment.[3]

President Truman had been following these developments with much concern. On 12 March 1947 he delivered a special message on Greece and Turkey, which later was known as the "Truman Doctrine," before a joint session of Congress in which he emphasized the world leadership responsibilities of the United States. This speech set forth a new national strategy which would support many of the national interests that form the foundation of the present United States international policies. In part, he acknowledged in the name of this great country the right of all peoples to enjoy self-determination. When this right is denied by any regime, international peace is placed in jeopardy and hence the security of the United States is challenged.[4] The mantle

---

[3]John W. Spanier, American Foreign Policy since World War II (New York: Praeger, 1960), p. 29.

[4]U.S. President, Public Papers of the Presidents; Harry S. Truman, 1947 (Washington: U.S. Govt. Print. Off., 1963), p. 176-180.

of leadership fell upon the United States, and even the exponents of isolationism recognized the obligation of international power enforcement.

Believing that the Soviets would develop an atomic weapon to couple with their bomber force, the United States knew it would be necessary to possess a strategic deterrent force capable of thwarting this threat. President Truman, included the treatment of this requirement in his Executive Order 9877 of 26 July 1947, the Unification Act of 1947, as he set forth the functions of the armed forces.[5] These functions were amplified that fall by the Key West Agreement which discussed general principles, common functions of the armed forces, functions of the Joint Chiefs of Staff, and functions of each of the three military services. For the first time strategic responsibility was officially recognized and assigned to the United States Air Force for implementation.[6]

The position of the United States was stated in the preface to the 1948 report of the Congressional Air Policy and the President's Air Policy Commission which summarized the sentiments of both groups: "It is the judgment of the Congressional Aviation Policy Board that the capability of the United States most likely to discourage an aggressor

---

[5] Ibid., p. 360-361.

[6] U.S. Navy Dept., Officer of the Management Engineer, The United States Navy (Washington: U.S. Govt. Print. Off., 1952), p. 66.

against attack upon this nation, most effective in thwarting such an attack if launched, and most able to deal out retaliation to paralyze further attack, is air power."[7] During this period the United States was pursuing a policy of strategic delivery of nuclear weapons by manned bombers.

Since 1945 the Soviets had been locked in the arms race; their primary efforts were being directed towards their development of an atomic weapon. They believed this accomplishment was necessary for them to achieve a balance of power with the United States. The results of their atomic scientific development and their exploitation of German technology were realized in 1949. On 23 September President Truman announced that the Soviets had exploded an atomic device.[8]

Knowledge of the Soviet actual capabilities and intentions was and is limited; as a result much drive and a minimum of direction caught the United States groping to determine what action to pursue next. A crach program was instituted to build up and deploy a massive bomber force to counter the anticipated massive long-range strategic bomber

---

[7]Carroll V. Glines, Jr., The Compact History of the United States Air Force (New York: Hawthorn Books, 1963), p. 298.

[8]U.S. President, Public Papers of the Presidents; Harry S. Truman, 1949 (Washington: U.S. Govt. Print. Off., p. 485.

force of the Soviets.[9] A retaliatory nuclear strike capability was in itself a strong deterrent; however, this was no defense against the attacking long-range strategic bomber if the deterrent were to fail.

Both the United States Navy and Army were working for a deployable surface-to-air guided missile as a defense against the strategic bomber. The Navy was advancing with the Terrier while the Army's efforts were focused on the first guided missile of the Nike family. In November 1951, the Army demonstrated the achievement of its goal when a Nike-Ajax successfully intercepted a B-17 target drone aircraft.[10] By advancing a theory of equal technology, the results of this success implied that a like capability for the Soviets was in existence or at least well within their technological ability.

With an effective defense against the strategic bomber in the deployment stage, it was necessary that advanced penetration weapons systems be developed. In 1947 a relatively small missile research program was being conducted which pointed toward operational systems five to ten years hence.[11] The ballistic missile program, which could have

---

[9]Institute for Defense Analysis, Economic and Political Studies Division, Ballistic Missile Defense and Soviet Strategy by Walter F. Hahn and Alvin J. Cottrell (Arlington, Va.: 1963), p. 22.

[10]U.S. Dept. of Army, Army Missiles Rockets, Pamphlet No. 355-13 (Washington: U.S. Govt. Print. Off., 1958), p. 37.

[11]Parson, p. 35.

resulted in an advanced penetration weapon, was cancelled; it was revived in 1951 and progressed at a snail's pace until 1953.[12] The pace accelerated in February 1953 when the United States Army registered a first: the launching by military personnel of a surface-to-surface ballistic guided missile.[13] This successful initial step was only a beginning; however, it was a giant step towards the development of an operational intercontinental ballistic missile (ICBM). By the end of 1954, the United States effort to achieve an ICBM had been completely reorganized, rejuvenated, and was being aggressively advanced.

The Soviets were also making giant steps in the field of missiles. Their spectacular developments captured the attention and imagination of the world. On 26 August 1957, they announced that they had completed a successful test of an ICBM.[14] Russian news agency, Tass, praised this achievement as a demonstration of Russia's leadership in missile development and emphasized that strategic air forces were obsolescent.[15]

---

[12]Ernest G. Schwiebert, History of the U.S. Air Force Ballistic Missiles (New York: Praeger, 1965), p. 45.

[13]Ibid., p. 37.

[14]"Russians Announce Firing Intercontinental Missile 'Huge Distance' to Target," The New York Times, 27 August 1957, p. 1:6.

[15]Parson, p. 44.

The success of the ICBM was still ringing clearly in the ears of the world when the results of an even greater Russian advancement were released on 4 October 1957. The New York Times carried the story of this break through in the 5 October issue under a full page headline, "Soviet Fires Earth Satellite into Space: It Is Circling the Globe at 18,000 MPH; Sphere Tracked in 4 Crossings over U.S."[16] Thus, the first earth satellite, the Sputnik, was born.

On 15 November 1957, Mr. Khrushchev stated in an interview with Mr. Shapiro of The New York Times, "We (USSR) have our intercontinental ballistic missile rockets and submarines. Our submarines can block American ports and shoot (into) the American interior while our rockets can reach any target. America's vital centers are just as vulnerable as NATO bases."[17]

Herman Kahn described the effects of these events in the following manner, "It is rather interesting that it was the advent of the ICBM, rather than the fact that the Soviets had acquired a strategic bombing force, that persuaded most people to think the vulnerability problem

---

[16]"Soviet Fires Earth Satellite into Space: It is Circling the Globe at 18,000 MPH Sphere Tracked in 4 Crossings Over U.S.," The New York Times, 5 October 1957, p. 1:1.

[17]Henry Shapiro. "Khrushchev Invites U.S. to Missile Shooting Match," The New York Times, 16 November 1957, p. 3:4.

through . . ."[18] Mr. Kahn was somewhat a victim of his own analysis when he stated "most people" had thought the vulnerability problem of the ICBM through. A number of knowledgeable people most certainly took a new look at the inferred missile delivery probability.

Congressional hearings were conducted on 20 and 21 November 1957 to examine the United States position and to determine what objectives and subsequent actions should be pursued. It was determined that, the nation was lagging behind the Soviet Union in ICBM development; however, the gap could be closed. The United States was pouring a tremendous effort into ICBM development and was utilizing the most competent scientific and technical personnel available to obtain the goal of a deployable ICBM. Aside from a rather frantic crash program, there appeared to be little additional application that could make a significant change in the date by which the United States could achieve its operational ICBM.[19] The first successful ICBM firing by the United States was accomplished in November 1958 when the Atlas made a down range flight over the Atlantic range.

---

[18]Herman Kahn, "The Arms Race and Some of Its Hazards," Donald G. Brennan, ed., Armes Control, Disarmament, and National Security (New York: Braziller, 1961), p. 112.

[19]U.S. Congress, House, Committee on Appropriations, The Ballistic Missile Program, Hearings (Washington: U.S. Govt. Print. Off., 1958), p. 5.

The successful development of the ICBM served to focus the world's attention on the strategic nuclear arms race. Delivery of a nuclear weapon could now be accomplished by the use of an ICBM, thus, the stage was set for the next phase of the offensive and defensive continuum between the two Goliaths. The United States and the Soviet Union had both developed a relatively effective defensive surface-to-air missile system against the manned bomber, but neither of these systems was effective against the sophisticated ICBM. The arms race now forced these two nations to consider the grave decision of whether to attempt the development of an anti-ballistic missile system or to accept the risks attendant with the complete reliance on an offensive deterrent strategy.

The Requirement for an Anti-Ballistic Missile. One of most important factors regulating the action of any nation state is the position of acknowledged leadership. With this recognition comes the maintenance of a protective umbrella to guard against aggression or threat of aggression by any nation to project its national policies internationally. In order for the United States to insure the required capability to extend protection, it was determined that a deterrent force must be available to negate the offensive potential of any possible enemy. This position was expressed by Samuel P. Huntington when he defined the arms

race "a progressive, completive peacetime increase in armaments by two states or coalitions of States resulting from conflicting purposes or mutual fears. An arms race is thus a form of reciprocal interaction between two states or coalitions."[20] The Russian ICBM potential dictated a counter weapon should be developed.

During the hearing before the House Committee on Appropriations relative to the ballistic missile program, the Hon' Neil McElroy, Secretary of Defense, while discussing the desirability of pursuing a development program under one activity, stated some of his recommendations for the responsibilities of such an activity. Among these, he cited research and development of an anti-missile missile as one of the primary problems for consideration.[21]

In examining the ICBM system, with an objective of developing a defensive system, the possible operational characteristics of the ICBM vulnerable to countermeasures had to be considered. These characteristics were discussed by Mr. Parson, as follows: "It may be destroyed (1) on the ground or at sea before it is launched, (2) during the initial power phase, (3) while it coasts through space in the middle portion of its trajectory, or (4) during the terminal phase

---

[20]Samuel P. Huntington, "Arms Races: Prerequisites and Results," Public Policy, Carl J. Friedrich and Seymour E. Harris, Comps., (Cambridge: Harvard University, Graduate School of Public Administration), p. 41.

[21]House Appropriations Committee, p. 63.

of flight as it reenters the atmosphere and approaches its intended target."[22] The most logical approach to a defense against the ICBM would be to extend the capabilities of an existing weapon system to counter the threat. In that the Nike family of guided missiles had a defense capability against the strategic bomber since 1953, it seemed reasonable that this system could be improved to counter the ICBM during its terminal phase of flight. This approach was adopted and additional development of the Nike family resulted in the Nike-Zeus concept. The status of this program was discussed by the Secretary of the Army in the 1960 Annual Defense Report when he stated, "Nike-Zeus is being developed to provide a defense of the United States against ballistic missiles. It is the only weapon under development specifically designed to meet the threat."[23]

The issue of an anti-ballistic missile was kept very much alive by continuous examination of the United States comparative posture with that of Russia. At the conclusion of the 1963 Senate Committee on Appropriations hearings on the Limited Nuclear Test Ban Treaty, the following statement was submitted:

---

[22]Parson, p. 180.

[23]U.S. Dept. of Defense, Secretary of Defense Annual Report, 1 July 1959 to 30 June 1960 (Washington: U.S. Govt. Print. Off., 1960), p. 188.

> From the evidence we have learned that the Soviets have overtaken and surpassed us in the design of very high yield nuclear weapons; that they may possess knowledge of weapons effects and anti-ballistic missile programs superior to ours; and that under the treaty it is entirely possible that they will achieve parity with us in low yield weapon technology. These things are not grounds for complacency. We believe very strongly that Soviet secrecy and duplicity requires that this Nation possess a substantial margin of superiority in both the quality and quantity of its implements of defense.[24]

Development of Nike-Zeus was progressing under a deliberate, positive program and was satisfying the design requirements. In 1965, Secretary McNamara, during hearings before the Senate Committee on Appropriations, stated that the Nike-Zeus had reached operational status during the summer of 1964.[25] He further stated that, "The Nike-Zeus testing program will be completed during the current fiscal year and all further testing will be taken over the Nike X program and will be continued on an urgent basis . . .".[26] With the capability of an anti-ballistic missile in existence, it now became a problem of deciding whether or not to deploy the present system, wait for a more advanced system, or not deploy an anti-ballistic missile system at all.

---

[24]U.S.Congress, Senate, Committee on Appropriations, Military Implications of the Proposed Limited Nuclear Test Ban Treaty, Hearings (Washington: U.S. Govt.Print. Off., 1963), p. 12.

[25]U.S. Congress, Senate, Committee on Armed Services, Military Procurement Authorization for Fiscal Year 1966, Hearings (Washington: U.S. Govt. Print. Off., 1965), p. 68.

[26]Ibid., p. 162.

CHAPTER II

CONSIDERATIONS FOR THE DEPLOYMENT OF AN ANTI-BALLISTIC MISSILE

The decision to deploy an anti-ballistic missile (ABM) will be examined by inspection of four controlling inter-related factors: military, economic, political, and psychological. These factors cannot be separated, although for convenience of this discussion they will be treated separately, in order that consideration of resulting arguments can be examined effectively, with a minimum degree of confusion, and a greater degree of effectiveness.

Military Factors. The military factors, which dictate deployment of an ABM, have developed through much debate over many years. Among these factors are the following: the effects of an ABM on both a short term and a long term war; the ability of the United States to survive a preemptive thermonuclear attack; the capability of the ABM to deal with projected enemy operations; and the effect on the balance of power resulting from the possible deployment of an ABM. These factors now form the foundation on which the present decisions are being formulated. Since the establishing of the anti-missile-missile program under United States Army responsibility in 1958, much discussion relative to these factors has been conducted.

From the initial ABM concept nearly everyone associated with the program has expressed the desire for a deployable system. Secretary of Defense Robert S. McNamara stated before the Senate Committee on Armed Services in 1961, "Everyone concerned with the problem of defense against ballistic missile attack is well aware that warning is not enough, and that a practical and effective system of active defense against the ICBM is also needed."[1] He also discussed reasons favoring steps to speed up deployment of an ABM system. Such a deployment would make an accurate estimate of the nation's defensive capabilities more difficult for a potential enemy and complicate his being able to achieve a successful attack. The protection that an ABM system would provide, even if for only a portion of our population, would be better than none at all. Secretary McNamara concluded that preproduction of certain components was recommended and that these would allow accelerated deployment of the ABM system, should tests prove its feasibility.[2]

Elvis J. Stahr, Jr., Secretary of the Army, gave the following testimony before the same committee, "I would not suggest for a moment that we replace the ability to strike with the ability to ward off. I would suggest we

---

[1]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1962, p. 14.

[2]Ibid., p. 15.

need both."[3] This policy embraces the dual military requirements of an offensive and defensive capability.

Before the Senate Committee on Armed Services in 1962, Secretary McNamara, who was again being questioned about the ABM made the following observation, "We must do whatever is feasible to develop, produce and deploy an effective system of active defense against ICBM attack."[4] Congressional interests in the progress of ABM developments were of such concern that they kept the program under continual examination.

During the 1963 Senate Appropriations Committee hearings, Dr. Harld Brown, Director of Defense Research and Engineering, while discussing the Nike X stated, "A typical Nike X Defense Center might consist of - One MAR (multiple array radar), a computing center, a few target tracking radars, and Zeus missiles, and a large number of Sprint missiles."[5] He further stated, "Nike X is an improved high performance, nuclear, anti-ICBM missile with a system designed to provide an extremely high kill probability against the enemy warheads."[6] The Nike X Defense Center is an integrated system which takes the MAR simultaneous targets evaluations and supplies this

---

[3] Ibid., p. 159.

[4] Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1963, p. 76.

[5] U.S. Congress, Senate, Committee on Appropriations, Department of Defense Appropriations for Fiscal Year 1964, Hearings (Washington: U.S. Govt. Print. Off., 1963), p. 1242.

[6] Ibid., p. 1265.

information to a computing center. Here each target-intercept-problem is examined and combined with target tracking radar information in order to generate the required intercept solution. This solution is fed into a Nike X for long range destruction or into a Sprint, high accelerating, surface-to-air missile, for short range target destruction.

Walter F. Hahn and Alvin J. Cottrell in their book, Ballistic Missile Defense and Soviet Strategy, stated that an ABM system would upgrade the credibility of deterrent strategy based on a countercity threat, reducing Soviet vulnerability to retaliation in kind.[7] They conclude that if the United States deployed an ABM system Soviet reaction would be one of the following: make a desperation, pre-emptive attack; make a quasi-surrender in the cold war; step up the arms race; or have a do nothing, passive response.[8] The merit of each of these four options is of primary concern to the United States in considering the deploying of an ABM.

United States military strategy is based on second-strike capability, which concedes the first strike to the enemy. If the enemy deployed an offensive weapon which could destroy the electronics of the United States silo-based missile, the ability of the United States to retaliate

---

[7]Institute for Defense Analysis, p. 9.

[8]Ibid., p. 34.

would be substantially reduced. This fear was expressed in depth in 1963 by General Thomas S. Power, Commander of the Strategic Air Command when he gave both classified and unclassified testimony before the Senate Preparedness Investigating Sub-committee. He referred to the electromagnetic pulse (EMP) phenomenon of high yield nuclear explosions and testified the United States would be in trouble if this electromagnetic weapons effect phenomenon actually was as destructive as indicated by many people. An important task was to determine whether the EMP from one high yield nuclear weapon was capable of incapacitating a large number of missiles at one time.[9] To counter this threat a weapons system would have to be deployed which could destroy an enemy ICBM prior to detonation.

In 1964 General William W. Dick, Chief of Research, U.S. Army, while discussing the Nike-X system before the Senate Appropriations Committee stated, "Nike X is the only system that could be available to the United States in the foreseeable future to combat enemy ICBMs."[10] The United States ABM defense posture, to counter the ICBM, was directed toward the development and deployment of a Nike X system which would be able to destroy an ICBM in its

---

[9] "Soviets May Have Ultimate ABM," Missiles and Rockets, 16 September 1963, p. 14.

[10] U.S. Congress, House, Committee on Armed Services, Military Posture for Fiscal Year 1965, Hearings (Washington: U.S. Govt. Print. Off., 1964), p. 7696.

terminal phase of flight. In 1965 General Harold K. Johnson, Chief of Staff, U.S. Army, emphasized the importance of the Nike X system when he testified before the Senate Armed Services Committee, ". . . (Nike X) is presently the only ballistic missile defense system under active development within the free world."[11] Secretary McNamara gave added impetus when he suggested to the House Appropriations Committee that one way of blunting an ICBM attack would be to deploy an ABM (Nike X) system which, although not capable of seriously degrading a Soviet ICBM attack, would be effective against a small scale, less sophisticated Chinese Communist ICBM attack.[12]

During the fiscal year 1967, Senate Appropriations Committee hearings Senator Strom Thurmond commented to Secretary McNamara, "I believe the Joint Chiefs of Staff recommended unanimously that we do proceed with this Nike X system." Secretary McNamara answered, "Yes, but it could be anything from a light defense against the Red Chinese threat to a very heavy, sophisticated defense directed against the Soviet threat. . . ."[13]

---

[11]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1966, p. 538.

[12]U.S. Congress, House, Committee on Appropriations, Department of Defense Appropriations for Fiscal Year 1966, Hearings (Washington: U.S. Govt. Print. Off., 1965), pt. 3, p. 357.

[13]U.S. Congress, Senate, Committee on Appropriations, Department of Defense Appropriations, Hearings (Washington: U.S. Govt. Print. Off., 1966), pt. 2, p. 726.

On 20 December 1966 the Associated Press reported that, at present, officials in Washington talk in terms of three types of ABM systems; a thin (light) system composed of radar-directed Nike Zeus batteries whose missiles would head off an enemy's oncoming warheads as far away as 400 miles and destroy them outside the atmosphere with nuclear bursts; a thicker system which would extend the defensive capabilities of the thin system by adding some superfast Sprint missiles which would ascend skyward at a mile a second to knock down any warhead which got past Zeus; and finally a thick system which would include a large number of Zeus and Sprint missiles, missile acquisition radars and multifunction array radars which would not only detect but track and sort out real from decoy missiles.[14]

Rear Admiral Chester Ward, USN (Ret) made the following observations in November 1966:

> American intelligence experts have concluded that, following an intensive and successful anti-ICBM test program in 1962-63, the Soviets are now deploying dual-purpose anti-aircraft, anti-ballistic missile defense complexes around their key cities at the rate of over a half-dozen every year; that the Soviets made the decision to go into production of this defense system early in 1964; and that this decision was taken only after they had thoroughly analyzed the results of their atmospheric nuclear tests of 1961-62. We should remember that these were the most extensive and elaborate series of nuclear tests yet conducted by any nation, including the USA. These crucial nuclear tests provided the

---

[14]"Light Anti-Missile System Seen," The Evening Bulletin (Providence, R.I.), 20 December 1966, p. 5:2.

> scientific information needed to convince the Kremlin planners that the time had come to go into production of the Soviet anti-ballistic missile system.[15]

Rear Admiral Ward additionally stated, "The advice of the Joint Chiefs of Staff is to go into production with the Nike Zeus–Nike X–anti-ballistic missile defense system at once." From a purely defensive point of view, possession of such a system would, in the event of a nuclear war, save the lives of an estimated 80 million Americans and at least three trillion dollars in property damage.[16]

Michael Getter reported in the Washington Report of 21 November 1966, "McNamara said that he believed there was now considerable evidence that they (the Soviet Union) are deploying an anti-ballistic missile system." In his consideration of our deployment of an ABM he indicated the first step in the United States deploying an ABM clearly involved installation of an area defense. An area defense, ostensibly deployed against the Chinese, would also have a disruptive effect on any Soviet strike, though of course, it could not repel it completely. The area defense could be augmented with the Sprint missile for a terminal defense of cities, or for defense of point targets such as ICBM complexes and hardened command posts, an option which has

---

[15]Chester Ward, "Soviet Anti-Ballistic Missile Program," Washington Report, 7 November 1966, p. 2.

[16]Ibid., p. 3.

strong backing in some quarters as the optimum, low cost deployment.[17]

General Earle G. Wheeler, U.S. Army, Chairman of the Joint Chiefs of Staff, during discussions before the 1966 Senate Appropriations Committee made the following recommendation:

> Examining essentially the same facts and factors that the Secretary has, I settle on the side that believes we should provide the damage-limiting forces, starting initially with the full fallout shelter program and the anti-ballistic missile program, and thereafter buying such increments of damage-limiting as seemed desirable in the light of the Soviet reaction.[18]

When questioned by the committee chairman, Senator Richard B. Russell as to whether he was in favor of deterrence by means of striking strength instead of a defensive system, he answered, "I want both, Mr. Chairman; do not misunderstand me. The first charge on the resources of this country, from a military point of view, is our strategic striking force. However, I try to look at this on both sides, and I believe that an additional damage-limiting force, as well as an assured destruction, is needed."[19]

---

[17]Michael Getter, "Soviet ABM Deployment Expected in Year," Technology Week, 20 November 1966, p. 11.

[18]U.S. Congress, Senate, Committee on Appropriations, Department of Defense Appropriations for Fiscal Year 1967, Hearings (Washington: U.S. Govt. Print. Off., 1966), pt. 1, p. 255.

[19]Ibid.

General Harold K. Johnson, Chief of Staff, U.S. Army, was questioned before the same committee. "General Johnson, what is your recommendation with respect to production and deployment Nike or Sprint ballistic missile defense system?" General Johnson answered, "I recommended that the funds be granted in the 1967 budget for preproduction, to establish a production base for the deployment of Nike X. . . ."[20]

President Johnson made it clear in his State of the Union address on 10 January that he does not intend to go ahead and build the Nike X antimissile system at the present time. Robert S. Horowitz, who has been following these developments made this observation, "Majorities of the two Armed Services Committees are convinced that such a system should be installed now, and immediately after the speech Senator John Tower (R., Tex.) said Congress most likely will vote the funds to start production of Nike-X despite the President's decision."[21]

As predicted, the pressure for deployment of an ABM has mounted; a report of this activity was published on 10 February 1967 in The Providence Journal. In part, it indicated that the Joint Chiefs of Staff are pressing for a multistaged deployment of the Nike X anti-missile system with the initial installation being a thin area defense

---

[20] Ibid., p. 537.

[21] Robert S. Horowitz, "Congressmen to Push Nike X Despite Johnson's Opposition," Navy Times, 25 January 1967, p. 13:1.

around the entire country, sufficient to intercept a modest attack from China or Russia.[22]

Economic Factors. In 1957 Secretary of Defense McElroy, while discussing the cost of an anti-ballistic missile program before the House Appropriations Committee, made the following statement:

> One of our problems is to judge the probable cost of such a program. These increasingly sophisticated and complicated programs of one sort or another, defensive or offensive, get into such very large numbers that the considerations of this as against other means of spending might indicate a greater or lesser speed of work on this and just the same kind of decision that we have to make all the time.[23]

The tremendous cost of an ABM system was evident from its initial inception; as a result, programmed expenditures were regulated after giving much consideration to the results of a continuing cost-effectiveness analysis. Secretary McNamara, testifying before the Senate Armed Services Committee in 1961, indicated that about $863 million had been programmed for the development, test and evaluation of an active defense against an ICBM. He estimated that about one and three quarters billion dollars would be spent on the ABM by the end of the developmental phase. In

---

[22]"ICBM Defense for 50 Cities Urged," The Providence Journal, 10 February 1967, p. 1:1.

[23]House Appropriations Committee, The Ballistic Missile Program, p. 25.

addition, while considering necessary production and deployment of expenditures, he stated it would cost well in excess of eight and one-half billion dollars to deploy an effective Nike Zeus system.[24]

During the fiscal year 1963 Senate Armed Services Committee hearings on military procurement, Lieutenant General Arthur G. Trudeau, Chief of Research and Development, Department of the Army, made this statement:

> Speaking of Nike Zeus; that this system--and I am talking now of total system cost--which includes both development and deployment--. . . the cost of the Zeus system is one-third of what SAC cost in the decade of 1950-60; it is one-third of the cost of the Continental Air Defense 1950-60; it is less than one-half of the Air Force's Air Defense Forces, in other words, their interceptor planes, from 1950-60; . . .; it is one-half of the cost of fighter aircraft in the period 1950-60; it is somewhat less than the cost of Polaris, and it is somewhat less than the cost of our aircraft warning (system). . . .[25]

General Trudeau pursued this discussion in order to substantiate that the cost involved in deploying Nike Zeus was well within the cost of previously accepted deployed defensive forces.

In 1964 Lieutenant General Dick testified before the Senate Appropriations Committee that through fiscal year

---

[24]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1962, p. 14, 37.

[25]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1963, p. 372.

1964, $387.2 million had been spent on Nike X and $1.381 billion had been spent on Nike Zeus.[26] This was the total financial involvement of the United States in the development of an ABM. The amount allocated for fiscal years 1965 and 1966 was $346 million and $393.6 million respectively, which indicates a yearly cost of something less than half a billion dollars.[27]

Cost-effectiveness is one of the primary considerations used in determining whether a weapons system should be developed and/or deployed. Louis Morton, author, discussed the cost of the Nike X, ABM, in an article for the Winter 1966 issue of The Virginia Quarterly Review. He concluded that a Nike X system would cost a minimum of $10 billion and could cost as much as a $100 billion. Morton's examination covered the total cost from a limited deployment with fallout shelters to a full deployment which included a massive civil defense program composed of both blast and fallout shelters.[28]

In 1966 Secretary McNamara testified before the Senate Appropriations Committee. In answer to a question by Senator

---

[26]Senate Armed Services Committee, Military Posture for Fiscal Year 1965, p. 7699.

[27]Senate Armed Services, Military Procurement Authorization for Fiscal Year 1966, p. 472.

[28]Louis Morton, "The Anti-Ballistic Missile," The Virginia Quarterly Review, Winter 1966, p. 29.

Strom Thurmond, relative to the Joint Chiefs of Staff recommendation to deploy the Nike X, he stated that there was a large variance in required funds for the desired level of deployment, ". . .ranging in cost from perhaps less than $5 billion in one case to $20 to $30 billion in another. What they (JCS) had in mind, and what the House had in mind, is not clear to me."[29] According to this statement, the deployment of a complete Nike X system would cost about half the annual defense budget.

In the 7 November 1966 issue of the Washington Report, Rear Admiral Ward, reported that the United States is diverting about $24 billion annually in an effort to put out the brush-fire war in Vietnam. If the nation deployed the Nike X system requested by the Joint Chiefs of Staff, the cost would be about $37 billion. Based on a five-year time span, this would require an expenditure of $7.4 billion a year or less than one-third of what the Vietnam war is costing the United States per year. Using Secretary McNamara's casualty estimates, which would result from a nuclear war, combined with the estimated cost of deploying a Nike X system, indications are that the cost of deployment would be about $86 for each American life saved.[30]

---

[29]Senate Appropriations Committee, Department of Defense Appropriations for Fiscal Year 1967, pt. 2, p. 726.

[30]Ward, "Soviet Anti-Ballistic Missile Program," p. 3.

On 14 June 1966 the House voted an additional $153 million to the Department of Defense's budget request for preproduction activities directed toward the deployment of an anti-ballistic missile defense system.[31] The Senate subsequently approved this action and thereby overrode the expressed desire of Secretary McNamara not to deploy an ABM at this time. This action reflected a positive Congressional attitude toward ABM deployment.

The Associated Press reported on 20 December 1966 that Pentagon sources had pointed out a factor which they said made it overwhelmingly logical for President Johnson to authorize fiscal 1968 funds to begin laying out some form of Nike X system. This factor was that a thin ABM network could fend off a light or accidental launch of Soviet or Chinese missiles in the early 1970's while serving as a base for any future expanded system.[32]

As reported in the 10 February issue of The Providence Journal, pressure for the deployment of an ABM area defense is mounting. The proposed system carries a price tag of about $3.5 billion with an expanded system which includes major urban areas and hardened command post and ICBM silo

---

[31]Mendel L. Rivers, "Authorizing Defense Procurement, Research and Development, and Military Pay," Congressional Record, 14 June 1966, p. 12441-12447.

[32]"Light Anti-Missile System Seen," p. 5:2.

complexes being estimated at about 22 billion dollars. Additional installations which could result from pressures from unprotected areas would increase the total investment to about $40 billion a figure which has been quoted from many previous cost-effectiveness studies.

Political Factors. The political factors, which have a direct influence upon the deployment of an ABM, are primarily internal issues for the country concerned. However, the internal actions of one nation in many instances cause political responses in other nations; thus,an examination of the interrelationship of political actions upon the deployment of an ABM will be discussed. As the public's knowledge of the ABM increased, the national interests in ABM capabilities likewise increased and the American public sought information as to the weapon's potential. The necessity of having a good public information policy was recognized by many government officials and thus an ABM educational program began.

During the 1963 Senate Appropriations Committee hearing, testimony was received from a number of witnesses on the ABM system. Secretary McNamara expressed the importance of the ABM program, even though at that time there did not seem to be any clear solution.[33] Dr. Harold Brown, Director of

---

[33]Senate Appropriations Committee, Department of Defense Appropriations for Fiscal Year 1965, p. 195.

Defense Research and Engineering, discussed the possible physical effects of an ABM upon the American public if the weapon was used. His primary concern was radioactive fallout. He concluded that a decision to deploy an ABM without provisions for fallout shelters would not be logical.[34] It is not uncommon when a new weapons system is thoroughly examined that the scrutiny brings to light fringe effects which must be dealt with. In this case, the requirement for fallout shelters places a large strain upon the tax dollar.

Stewart L. Pittman, Assistant Secretary of Defense (Civil Defense), appeared before the 1963 Senate Armed Services Committee which was holding hearings on a fallout shelter program. He commented that regardless of how chances of survival were rated in a nuclear war, the stakes would be too great to ignore taking any practical actions which would reduce casualties.[35] The direct relationship between the ABM system and fallout shelters augment each other in providing additional protection to reduce casualties which neither by itself could attain, when discussing casualties associated with a nuclear exchange, the number most frequently used is tens of millions. Any reasonable reduction in this number of casualties should be explored to the fullest extent.

---

[34] Ibid., p. 1242.

[35] U.S. Congress, Senate, Committee on Armed Services, Civil Defense-Fallout Shelter Program, Hearings (Washington: U.S. Govt. Print. Off., 1963), p. 3087.

Secretary McNamara, during the 1964 Senate Appropriations Committee hearings, testified that the effectiveness of an ABM system in saving lives depends in a large part upon the existence of an adequate civil defense system. In the absence of adequate fallout shelters, an active defense system might not significantly reduce the casualties of an all out nuclear exchange.[36] A partial installation, whether a fallout shelter system or an ABM system, is not acceptable in the American society. As indicated by Freeman J. Dyson, professor of physics, Institute for Advanced Study at Princeton, ". . . it is generally agreed among the experts that a limited or token deployment of ABM in the United States would be politically impossible."[37]

The United States decision to deploy an ABM is not based on internal political factors alone. With proliferation of nuclear weapons and continued weapons development by potential enemies, international politics has assumed a vital role in influencing the actions of the United States. World problems are still held in a lesser light than the possibilities which could arise in relations with Russia although these problems are changing United States policies. Care must be exercised

---

[36]Senate Armed Services Committee, Military Posture for Fiscal Year 1965, p. 7017.

[37]Freeman J. Dyson, "Defense Against Ballistic Missiles," Bulletin of the Atomic Scientists, June 1964, p. 16.

to insure that errors in the evaluation of international situations are reduced to a minimum in order that timely necessary decisions be made. This question was posed by Louis Morton while discussing the ABM, "Is not the deployment of an ABM system better from the result of plan rather than scramble of defense unity after the fact of a hostile act?"[38]

Theoretically and technically, it is possible to counterbalance the absolute weapons of offense with equally absolute weapons of defense. However, with the cost of new weapons systems ever increasing, a thorough analysis by cost-effectiveness methods has become a major portion of the yardstick by which determination for deployment is established. The question which most often requires an answer is whether the cost of a new defensive system gives an equal or greater return than an equal expenditure for improved offensive capabilities. Even when the answer is in favor of the defensive system, the tax dollar expenditure must be justified in the eyes of Congress and the administration.

The 11 November 1966 issue of The Providence Journal indicated that the Johnson Administration believes the Russians are building and deploying an ABM system.[39] This

---

[38]Morton, p. 31.

[39]"Soviet Missile Defense Seen," The Providence Journal, 11 November 1966, p. 1:6.

announcement created much interest. Senator Thurmond, member of the Senate Armed Services Committee, indicated that the Soviet system should not be underestimated, in view of the fact that the Soviets have sufficient confidence in the effectiveness of their system to commit the expensive resources required to deploy such an elaborate system.[40] Senator Richard B. Russell, Chairman of the Senate Armed Services Committee was reported as being in favor of Nike X production. Many other senators were also in favor of positive action, among them Senator William Proxmire who warned that, if the Soviets believe their ABM system can prevent the penetration of their defenses by United States ICBMs, the temptation for a nuclear attack by the Russians would be great and the urgency of deploying the United States ABM, regardless of cost, would be obvious.[41]

In the 20 December 1966 issue of The Philadelphia Inquirer comments relative to the ABM expressed the opinion that political necessity would force the United States to a useless arms race, despite Secretary McNamara's downgrading of the effectiveness of ABMs, unless the Russians can be persuaded to put a lid on their development and deployment. Considerable Republican criticism that the administration

---

[40]Getter, p. 10.

[41]"Senators Ready to Press for Nike X," Technology Week, 12 December 1966, p. 13.

was permitting an ABM gap to develop prompted a statement that the United States could not afford to neglect the protection of its people from possible missile attack.[42] An ABM deployment decision now could serve to disarm critics who other wise might continue the claim that the Administration has allowed a crucial ABM gap to develop.

The State Department is now involved in a major effort to get the Soviets to back away from their ABM deployment, but most observers do not believe that these efforts will yield results.[43] Past records indicate that Russia will pursue any development and deployment which would improve her existing position regardless of outside influence. In that the disclosure of the Soviet ABM politically involved President Johnson, there was considerable feeling by Washington observers that he would decide to authorize some ABM production funds in fiscal year 1968 to appease Congress without bankrupting the Department of Defense budget.[44] If funds for an ABM system are not allocated, the public which is now aware of the ABM status, will probably pressure the Administration into some ABM system deployment.

---

[42]"U.S. Urges Soviet to Delay Installing New Missile System," The Philadelphia Inquirer, 20 December 1966, p. 1:6.

[43]"More Signs Point to Nike X Production," Technology Week, 9 January 1967, p. 17.

[44]"The Countdown-LBJ Ponders Modest Nike X Beginning," Technology Week, 2 January 1967, p. 3.

James Reston, news analyst, reported his assessment of the ABM status on 22 January 1967. He concluded that the Russians will not settle for a balance of terror but will insist on, and continue to deploy, an ABM system around their major cities even if these defenses are inefficient. President Johnson's opposition will insist on building an American ABM system, and a shelter system to go with it, regardless of the evidence that this will not aid American security. It is not conceivable that President Johnson will tell the American people that they cannot defend themselves against nuclear attack, even if, scientifically, defense is not possible.[45]

Psychological Factors. There are many factors, whether real or unreal, logical or illogical, that cause man to express himself in terms of self-interest. These factors have a decided influence upon whether the United States will or will not deploy an ABM system and set the stage for a countdown to a decision.

During the 1961 Senate Armed Services Committee hearings, Senator Thurmond made the following observation about an ABM system:

> Even though it would cost a great deal of money, the amount saved if one city is destroyed, would pay for the cost of this program, and my

---

[45]James Reston, "Washington: The Paradox of Power," The New York Times, 22 January 1967, p. 14E:4.

> personal feeling is that the greatest thing this Government can do is to provide for the security of its citizens, for the protection of its people, even if we have to cut back on many welfare, so-called welfare programs and others.[46]

Testifying before the same committee, General George H. Decker, Chief of Staff of the Army, while discussing the disadvantages which would ensue if the Soviets were to deploy an ABM system before the United States did, made it clear that the Army would press forward with Nike development, in order to insure the earliest possible availability of an ABM system.[47]

In his book on missiles Mr. Parsons discusses the missions of the armed forces and concludes that the primary mission is to provide an overwhelming deterrent to war in its blackest forms and to furnish the means and assistance to end the gray war. He continues this thought by quoting Winston Churchill, "It looks as though all these new weapons are going to make peace unavoidable." There must be continual military preparation to be sure that peace is maintained; but if this should fail, the United States should have an effective defensive posture which should include dispersal of critical installations, a protective shelter system, an

---

[46] Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1962, p. 63.

[47] Ibid., p. 177.

ABM system, and an efficient attack warning system.[48]

Authors Hahn and Cottrell extend the ABM consideration with a number of observations. Deployment of an ABM system by the Soviets would be consistent with their military doctrine, tradition, and current military environment. However, China is holding many of the cards which directly affect Russian actions. On the other hand, if the United States made a full deployment, the Soviets would probably stage a build-up of both offensive and defensive capabilities on a fairly broad front.[49] The Soviets' military posture is one of the keys to their overall strategy of deterrence. In contrast to public opinion in the United States, which would probably demand a full deployment or none, the Soviets can decide to deploy a token ABM system around one or two cities. They know that such a decision would not be challenged by skeptics of the ABM effectiveness or by other population centers seeking similar protection.[50]

The 1963 Senate Armed Services Committee concluded their hearings on the Limited Nuclear Test Ban Treaty with these observations: The Soviets have surpassed the United States in the design of very high yield nuclear weapons; that under the treaty it is entirely possible they will achieve parity

---

[48]Parson, p. 5, 16, 179.

[49]Institute for Defense Analysis, p. vii-ix.

[50]Ibid., p. 18.

with the United States in low yield weapons; and they may possess superior ABM programs. The United States must avoid complacency and must possess a substantial margin of superiority in both the quality and quantity of its implements of defense.[51] From these findings it is evident that the United States should be ready today to counter the weapons which could be launched today.

Freeman J. Dyson reported in the June 1964 issue of Bulletin of the Atomic Scientists that in the past ten years an ABM had been developed which provided some defense although not absolute. With continued development, the resulting ABM might well be able to save attacked cities and thus avert a general holocaust.[52] History indicates that continued development of new and improved weapons is an unending cycle which never stabilizes. Technology of offensive weapons does in general outstrip the technology of defensive weapons; however, care must be exercised to insure the United States does not fall victum to the habit of thinking that supremacy of offensive weapons is permanent or automatic.

Dyson believes that future wars differ only in severity. After the terrible initial attack losses, both sides will

---

[51]Senate Armed Services Committee, Military Implications of the Proposed Limited Nuclear Test Ban Treaty, p. 12.

[52]Dyson, p. 13.

continue to fight to the best of their ability with whatever they have left. He contends that the time to deploy a weapons system is the time when the system is first ready for use, so that it will be available if needed.[53]

In 1965 Secretary McNamara discussed strategic objectives of the United States and Russia before the Senate Armed Services Committee holding hearings on Military Procurement Authorization and stated, ". . . each of us has as a requirement for our strategic forces, one, assured destruction in the sense of making a strike by its opponent so costly as to deter that strike, and two, a requirement for limiting the damage to the maximum degree practical to its own people in the event that deterrence fails."[54]

Dr. Harold Brown projected cost-effectiveness into the expected casualty levels by examining the calculated number of dollars required by the defense in comparison with the calculated number of dollars required by the offense. His conclusion was that at low United States casualty levels the exchange ratio would be unfavorable to the defense, while at higher casualty levels, the exchange ratio shifts toward the defense.[55]

---

[53] Ibid., p. 15-16.

[54] Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1966, p. 246.

[55] Ibid., p. 472.

Louis Morton quoted General N. Talinsky from an article in the January 1965 Soviet Journal on International Affairs, "From the standpoint of strategy, powerful deterrent forces and an effective anti-missile defense system, when taken together, substantially increase the stability of mutual deterrence, for any partial shifts in the qualitative and quantitative balance of these two component elements of mutual deterrence tend to be correspondingly compensated and equalized."[56] Thus the deployment of an ABM system would enhance the national security which would in turn contribute to world peace.

An editorial in the 9 January 1967 Technology Week examined the principal intelligence factors which are involved in the decision for the United States to deploy an ABM system. If the Soviets' ABM system deployment becomes widespread, with acknowledged increases in their offensive missile forces, plus awarding them a first-strike position, all this could lead to a very dangerous position for the United States. The Soviet ABM must be awarded some technical respect and most certainly must be considered in the continuing evaluation of the balance of power.[57]

James Reston reported on 21 January 1967 that the scientists of the world have produced a strategic military

---

[56]Morton, p. 31.

[57]"More Signs Point to Nike X Production," p. 17.

revolution whereby the attacker has achieved an alarming advantage over the defender. Both the United States and Russia have more power than any nation state in history has ever controled, but paradoxically they have less security. Each can destroy the other but both are less secure. In the past, if ten percent of a striking force could be destroyed, a defense was considered effective; however, today even if 90 percent of ICBM's were destroyed, the remaining ten percent could result in tens of millions casualties on either side.[58]

The deployment of the Soviet ABM requires a combative reaction by the United States to insure that an unbalance in military power in favor of the Soviets does not develop. If the effectiveness of the Soviet ABM is as reported, that is, able to neutralize the United States arsenal of long-range nuclear weapons, another phase of the arms race has been generated.[59]

---

[58]Reston, p. 14E:4.

[59]"X-Rays to Paralyze Missiles Reported Developed by Soviets," The New York Times, 30 January 1967, p. 10:3.

CHAPTER III

CONSIDERATIONS AGAINST THE DEPLOYMENT OF AN ANTI-BALLISTIC MISSILE

In the August 1965 issue of Armed Forces Management James L. Trainor posed a number of major questions which, in his opinion, should be investigated before a decision to deploy an ABM is made. Among these were the following: (1) What would be the effect on United States security in the time frame of mid 1970's if an ABM system were not deployed? (2) How much of a problem will proliferation of nuclear weapons to countries not now possessing them be in the 1970's? (3) How does the ABM contribute to damage-limitation and is that contribution worth the cost? (4) Is an ABM destabilizing? (5) If the United States deployed an ABM would the Soviets increase spending to maintain a balance of power? and (6) What is the relation between an ABM and a civilian fallout shelter system?[1]

There are many knowledgeable persons who argue against the deployment of an ABM system. Their discussions and opinions are based upon those factors which were considered while examining the possibility of deploying an ABM system. Although these factors are interrelated, they will again be examined separately and in the following order: military,

---

[1]James L. Trainor, "Should U.S. Deploy Nike-X?" Armed Forces Management, August 1965, p. 31-35.

economic, political and psychological.

Military Factors. It is a fact that a nuclear weapon can be delivered by an ICBM. Everyone concerned with the problem of defense realize that the United States must have a practical, effective, active defense against the ICBM threat. The increasing interest in an ABM has resulted in much testimony before a number of federal committees.

During 1961 Senate hearings, Secretary McNamara, while discussing the present state of development of an ABM system, stated, "It is our conclusion that we should continue development, test and evaluation phase of this program on an urgent basis, but we should not at this time take any steps for the production and deployment of the system.[2] Senator Francis Case endorsed this proposal and stated his opinion of the Nike Zeus as an ABM; "I cannot conceive of how you (the members of the Senate Committee) can anticipate any effective defense with it." In general, he emphasized that he had no great confidence in an anti-missile-missile as a deterrent and suggested that instead of trying to create the ability and means to ward off an attack, the United States should continue a policy of deterrence essentially by improving and maintaining an effective strike

---

[2]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1962, p. 16.

capability.[3]

In 1962 the Nike Zeus became an issue before the Senate Armed Services Committee. Secretary McNamara testified that because of the serious question as to the practicality of the Nike Zeus system, no funds were being recommended for procurement and deployment at this time.[4] As indicated in Chapter II, this decision is in consonance with the fact that United States military strategy relies on a second-strike capability. This concept concedes the first strike to the enemy and bases deterrence on the United States ability to survive and still retaliate.[5]

Endorsement of retaliatory deterrence was indirectly given by Mr. Khrushchev when he admitted on several occasions that he saw no way to contain nuclear devastation of the Soviet Union within tolerable limits, should general war materialize.[6]

Does the ABM have a deterrent capability which would enhance the strike capability of a country and not have an unbalancing effect upon balance of power? This was discussed by Professor Dyson when he considered the effect of ABM

---

[3] Ibid., p. 57, 159.

[4] Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1963, p. 81.

[5] "Soviets May Have Ultimate ABM," Missile and Rockets, 16 September 1963, p. 14.

[6] Institute for Defense Analysis, p. 16.

deployment on strategic stability. He defined stability as a situation in which neither side is tempted to an unprovoked attack on the other by hopes of a cheap victory. Among arms control experts stability is identified with supremacy of the offensive, and demands the existence of invulnerable and irresistible retaliatory offensive forces. Deterrence against the first strike must exist in the form of a threat of an immediate and irresistible second strike. Equating stability with vulnerability has the consequence that deterrence and defense are regarded as incompatible. Deployment of an ABM expresses an intention of creating invulnerability and thus upsetting stability. This reasoning has caused violent opposition to the deploying of an ABM.[7]

Before the 1964 Senate Appropriations Committee, Secretary McNamara, while discussing the task of adopting the United States defensive system to future threats, made the following observations: "The more fundamental changes hinge on decisions which we have yet to make with respect to the Nike X and on Congressional action on our civil defense program. Thus there would be little point in further improving our defense against the ICBM and submarine-launched missile threat, including the defense of our population against fallout." He later concluded that by 1965 there should be considerably more information upon which to base

---

[7]Dyson, p. 16.

a judgment on the technical feasibility of the Nike X system. To be effective the Nike X must provide protection against the ICBM with penetration aids and decoys of advanced systems. In order to have an active ballistic missile defense system it would be necessary to have in existence an adequate civil defense system. In the absence of adequate fallout shelters, an active defense might not significantly increase the proportion of the population surviving an all out nuclear attack. He proposed a high priority research and development Nike X program without commitment to its ultimate production and deployment.[8]

While the United States was continuing development of an ABM, the Soviets were also pursuing an ABM development. Hahn and Cottrell evaluated the Soviet position in the following manner:

> The main point to be made here is that, no matter what may be the long-range Soviet decisions regarding an ABM capability, it is highly doubtful that the Soviets could, in the foreseeable future, move into a crash program of extensive ABM development and deployment without doing serious harm to domestic commitments, foreign policy objectives and competing military programs.[9]

Before the 1965 Senate Armed Services Committee, Secretary McNamara stressed that relative actions and reactions should be considered when examining an ABM system.

---

[8]Senate Appropriations Committee, Military Posture for Fiscal Year 1965, p. 7011, 7017.

[9]Hahn and Cottrell, Orbis, Summer 1965, p. 317.

He emphasized that the United States is pursuing a comprehensive penetration aids effort in order to be prepared for the possibility that an opponent may deploy a relatively effective ABM system around his urban/industrial areas. He stated that such aids should prove to be very effective against any likely defense.[10]

Secretary McNamara extended his discussion to the possibility of the deployment of the Nike X;

> Over and above the technical problems there are even greater uncertainties concerning the preferred concept of deployment, the relationship of the Nike X system to other elements of a balance Damage Limiting effort, the timing of the attainment of an effective nation-wide fall-out shelter system and the nature and effects of an opponent's possible reaction to our Nike X deployment.[11]

He concluded that deferring the decision to deploy an ABM for a year may delay achieving an operational capability; however, if ultimately deployed the United States would have a more reliable system. He proposed that in fiscal year 1966 the United States concentrate on the "building block" concept of Nike X to permit maximum flexibility and effectiveness in deployment.[12] The "building block" concept referred to by Mr. McNamara is a process, whereby development

---

[10]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1966, p. 60.

[11]Ibid., p. 67.

[12]Ibid., p. 225, 472.

is accomplished by improving weapons which exist, a system of progressive advancement to an effective end-product.

During the 1966 Senate Appropriations Committee hearing, Secretary McNamara made the following statement relative to the Nike X:

> It does not appear that that system can provide substantial protection against a sophisticated offensive threat (deleted). It does appear that it could provide some degree of protection against a less sophisticated threat such as the Red Chinese might have in the mid-1970's. Whether it would be wise actually to deploy a version of the Nike X system against a Red Chinese threat in the mid-1970's is still open to question. A decision is not required at this time because the production lead time of the system is such as to allow it to be deployed by mid-1970's with a later decision.[13]

He continued this discussion in length and concluded that based on present knowledge of enemy capabilities and the United States status of ABM development, no deployment decision need be made now.[14]

Mr. McNamara, in a news release on 10 November 1966, commented on the possible deployment of the Nike X system. He indicated that President Johnson and he had discussed this and had concluded it was much too early to make a decision to deploy. However, they did not rule out future

---

[13]Senate Appropriations Committee, Department of Defense Appropriations for Fiscal Year 1967, pt. 2, p. 702.

[14]Ibid., p. 1, 61-63.

deployment. Relative to the use of Nike X as a counter to a Chinese threat, he stated; "The length of time required to deploy such a system is less than the length of time required for the Chinese Communists to develop nuclear weapons that could conceivably threaten this nation. Therefore, it is not timely at this time to make a decision to deploy such a threat to defend against the Chinese Communist threat."[15]

As indicated by Rear Admiral Ward, the Department of Defense was stressing offensive, penetration capabilities as the deterrent force of the United States and would delay preproduction activities of an ABM system for another two years.[16] Secretary McNamara disclosed on 10 November that the Russians had started installation of an ABM system around Moscow and Leningrad. He emphasized that the ABM could never be a really effective defense against improved missiles and that the best defense is an improved offense.[17]

The 11 February issue of The Providence Journal carried a news release which indicated Mr. McNamara had told Congress he opposes the costly Nike X deployment because, even if the Soviets did not react by increasing their ICBM strength,

---

[15]"Soviet Missile Defense Seen, " p. 22:2.

[16]Chester Ward, "Another Pearl Harbor?", Washington Report, 12 December 1966, p.3.

[17]"U.S. Urges Soviets to Delay Installing New Missile System," p. 1:6.

they could still kill from 20 to 40 million Americans in an allout attack. If, however, the Russians chose to build a compensating number of ICBMs the fatalities could mount to as many as 120 million.[18]

Economic Factors. Cost-effectiveness, one of the major yardsticks used by the Department of Defense and Congress during formulation of the annual military budget, has in a large measure evolved from the monstrous cost of the new, technical weapon systems. This procedure of analysis is employed to determine absolute cost, that is, the relative unit cost of a defensive system compared to the unit cost of the offensive system which it is designed to nullify.

In 1959 General Maxwell D. Taylor, Chief of Staff, U.S. Army, realized the importance of continued development of existing missile systems, the "building block" concept. His goal was to develop a defensive weapon which could effectively counter an ICBM. No funds however, were authorized for initial production of tactical equipment or missiles. Funds of adequate amounts were allocated for development and evaluation of an active defense system to satisfy military requirements.[19]

---

[18]"ICBM Defense for 50 Cities Urged," p. 4:4.

[19]U.S. Congress, Senate, Committed on Armed Services, Missile and Space Activities, Joint Hearing before the Preparedness Investigating Subcommittee of the Committee on Armed Services and the Committee on Aeronautical and Space Sciences (Washington: U.S. Govt. Print. Off., 1959), p. 23.

In general, economic decisions are related to equivalent financial effects. Of primary consideration in the development of any new weapons system is the cost involved to counter or respond to another nation's actions. The importance of keeping a finger on the pulse of foreign defense appropriations cannot be overemphasized, for a change in appropriation indicates what response may be required. Hahn and Cottrell drew the following conclusion from their observation of the interrelated action of expenditures and capabilities: Extensive Soviet ABM development would result in serious harm to the internal stability of the Soviet Union. During this period the Soviets were apparently involved in vehement and chronic internal arguments as to the relative allocations of resources.[20] The authors concluded it seemed clear that the answer to deployment of an ABM would not be solved through cost effectiveness analysis alone but would continue to be influenced by estimates of Soviet progress and intentions in the ABM field.[21]

Care must be exercised by the United States to reduce the possibility of being decoyed into a qualitative or quantitative response similar to the 1950 massive bomber

---

[20]Institute for Defense Analysis, p. 14, 33.

[21]Hahn and Cottrell, Orbis, Summer 1965, p. 317.

force buildup. Secretary McNamara, while testifying before the 1964 Senate Appropriations Committee, indicated that the cost of one possible ABM defense system would amount to about $16 billion and that it would cost substantially more to operate the system. He concluded, before the United States makes the huge investment required for the deployment of an ABM system, there must be careful consideration about what additional measures might be required; for example, civil defense actions.[22]

Professor Dyson contended that the ABM system was unattractive for two major reasons. First, such a system was wastefully expensive when compared to an offensive, penetrating system; and second, the deployment of an ABM would be likely to stimulate a large increase of offensive forces on both sides, with no gain to the security.[23]

Secretary McNamara did not agree with Professor Dyson on the issue that increased offensive forces would not result in a gain to the security. Jeremy J. Stone wrote in September 1966 issue of the Bulletin of the Atomic Scientists that Secretary McNamara recently declared the sky was the limit and that the entire military budget would be devoted, if necessary, to the task of insuring United States ability

---

[22]Senate Appropriations Committee, Military Posture for Fiscal Year 1965, p. 7017.

[23]Dyson, p. 14.

to retaliate through Soviet defenses.[24]

Secretary McNamara indicated to the 1966 Senate Appropriations Committee that the President's budget for fiscal year 1968 would not include money to provide for the deployment or production of the Nike X system.[25] He went on to testify:

> . . . that the first call on our resources must be for an assured destruction capability, because this is the foundation of our deterrent against large deliberate Soviet attack, by their nuclear or nonnuclear, against the West. But, of course, that first call takes but only a small percentage of our resources, something on the order of perhaps $5 billion a year, and we have ample resources to go beyond that, if it seems desirable to do so. It is in that context that we must consider the antiballistic missile system. There is no question in my mind but what we have the resources to procure that system, if we think it adds measurably to our safety. I do not believe it does, and therefore I would recommend against it.[26]

An Associated Press news release in the 20 December 1966 issue of The Evening Bulletin (Providence, R.I.) stated that high ranking officials outside the Defense Department had made the following report; "Antimissiles, these officials said, will not alter the present balance of power, but will put extraordinary financial burdens on both the United States

---

[24]Jeremy J. Stone, "ABM - The Next MLF?" Bulletin of the Atomic Scientists, September 1966, p. 20-21.

[25]Senate Appropriations Committee, Department of Defense Appropriations for Fiscal Year 1967, pt. 2, p. 702.

[26]Ibid., pt. 1, p. 258.

and Russia."[27] Similar feelings were expressed by President Johnson in his 1967 State of the Union address when he considered embarking on a new armament race to counter the Russian ABM. The race, he said, "would impose on our peoples, and on all mankind, an additional waste of resources, with no gain in security to either side."[28] James Reston reenforced this opinion on 22 January 1967; he said, "It is not only that an antimissile race would cost at least $80 billion on both sides . . . that even after the $80 billion was spent, the chances are that neither Washington nor Moscow would really have changed the balance of power. Both would have infinitely more power, but no more, and probably even less, security."[29]

Political Factors. Time was the teacher which brought the ABM system under the scrutiny of the public. In answer to increasing inquiries as to whether the ABM would perform to an acceptable degree of effectiveness, Professor Dyson published his observations. He noted that the usual development/deployment procedure employed to investigate a new weapons system is to install a token number for evaluation.

---

[27]"Light Anti-Missile System Seen," p. 5:1.

[28]Horowitz, p. 13:1.

[29]Reston, p. 14E:4.

However, a token ABM system, although compatible with such an examination, would not be acceptable to the public because it would probably demand an all-or-nothing deployment. Therefore, if a decision to deploy an ABM were made the United States would be immediately committed to a vast and probably permanent addition to the military establishment. On the other hand, a decision not to deploy would not have the same irrevocable character. A decision against deployment could be reversed, however, when a particular system became technically ripe for deployment. The savings which could result from the delay strongly influence decisions which are made today.[30]

Professor Dyson developed another consideration when he commented on a possible response to published enemy ABM capabilities. If the Soviets desired to use the ABM as a bluff either by falsely indicating the system's use or by a limited deployment, the United States response might be a massive counterdeployment of an ABM. This in turn could cause additional Soviet installations to be constructed in security, but would only lead to increased fear, frustration, and danger.[31]

Secretary McNamara expressed strong opposition to the deployment of the ABM during the 1965 hearings before the

---

[30]Dyson, p. 16.

[31]Ibid., p. 17.

Senate Armed Services Committee. He testified that, "Joint Chiefs recommended an additional (deleted) million in present production funds be allocated to Nike X to preserve an initial operational capability in (deleted). I deferred any decision relating to such funds until next year, with recognition that the system is not yet fully designed and I don't believe we are in a position today to make a production decision."[32]

Philip Green, while discussing factors which should be considered when investigating a new weapons system, made the following observation:

> In the case of all the various studies of comparative cost effectiveness of competing weapons systems that are referred to by system analysts . . . the relevant employer is the Department of Defense or some branch of the armed services. But when certain kinds of broad policy questions are being asked, the employer who asks them is not the Department of Defense but the public; and the answers being sought are not technical estimates of cost effectiveness but complex and indissolubly political judgments.[33]

It has become more and more evident that political factors must and should be considered when examining total effects of a new weapons system.

In the 21 November 1966 issue of the Washington Report Michael Getter said that Secretary McNamara had stated that

---

[32]Senate Armed Services Committee, Military Procurement Authorization for Fiscal Year 1966, p. 355.

[33]Philip Green, Deadly Logic (Columbus: Ohio State University Press, 1966), p. 18.

if an ABM system were deployed it must move ahead hand-in-hand with a shelter program.[34] Public protection must be considered as a related factor whenever a new weapons system is being examined for development and/or deployment. On the other hand, public opinion should not be granted a final decision-making position, as was indicated by James Reston in an editorial on power in the 22 January 1967 issue of The New York Times. He stated, if Moscow insists on power, specifically an ABM system, it will be too bad, because the result will be another futile and fantastically expensive round in the arms race. The Russians are concentrating on stopping missiles instead of stopping war, unfortunately, despite the President's entreaties that the Soviet Union and the United States should agree to a mutual freeze of anti-missile deployments.[35]

Psychological Factors. The response of a nation to a given situation has resulted many times from the action of one individual, an action which gathers support and momentum until a majority decision is attained. Self-preservation is one of the dynamic forces which is most susceptible to such mass response. The ABM, a force of self-preservation, falls heir to a real time mass response consideration in order to

---

[34]Getter, p. 10:2.

[35]Reston, p. 14E:4.

attempt to answer the unanswered question of ABM deployment.

In 1963 Secretary McNamara stated to the Senate Committee on Appropriations, "This antiballistic-missile program is such an important one to us, even though at the present time we do not see a clear solution to it, that I have been spending a good part of my own time following it."[36]

Not only was the progress of the United States in the ABM development important but progress of the Soviets had to be watched carefully to determine what course of action they would pursue. Hahn and Cottrell evaluated the Soviet position as follows:

> Final response would be an acceleration of the broad Soviet strategic development efforts, offensive as well as defensive. They would probably expand their own ABM program at the same time funneling new resources into intercontinental delivery systems. The latter would probably include both quantitative and qualitative increases in offensive power (greater numbers of missiles as well as more powerful warheads), as well as improvements in the survivability of their delivery systems against United States counterforce capabilities.[37]

During the 1964 Senate Appropriations Committee hearings, Secretary McNamara discussed the possible results of an enemy follow-on attack upon the United States. He

---

[36]Senate Appropriations Committee, Department of Defense Appropriations for Fiscal Year 1964, p. 195.

[37]Institute for Defense Analysis, p. 37.

concluded that requirements for defensive forces are closely related to the size and character of the civil defense program.[38] Many times a new weapons system has fringe effects which must be examined to insure the most satisfactory solutions to possible resulting problems. In the case of the ABM, radiation fallout is a problem and a fallout shelter system is a possible solution.

Philip Green made the following comment in his recent book, Deadly Logic, when he was examining the works of Herman Kahn, "At times, indeed, Kahn does talk as though any effort saving any amount of lives were ipso facto justified, no what its ramifications, but I cannot believe that he would erect so complex an edifice of work on the foundation of a statement so absurd." He continued, ". . . if deterrence theory really has 'won' whatever debate its proponents were engaging in, it still at least stands as an object lesson about how such debates ought not to be conducted in the future."[39]

Another consideration which should be evaluated when examining an enemy's action is United States vulnerability to propaganda. The United States is susceptible to Russian

---

[38]Senate Appropriations Committee, Military Posture for Fiscal Year 1965, p. 7010.

[39]Green, p. 81, 276.

propaganda and care must be exercised to avoid unnecessary response to Soviet published actions. As pointed out by Professor Dyson, Russia could bluff deployment of an ABM or could exaggerate its capabilities and, thereby, distract attention from its weaknesses.[40] Hahn and Cottrell came to the same conclusion. An educated understanding should be the guide for responsive action. In the case of the ABM, action could be in the form of a crash ABM development.

Rear Admiral Ward recapitulated the official discussion of the United States ABM in this manner: The Soviets would not dare to attack because of the United States devastating retaliatory strike capability. Therefore, there is a delicate balance of terror which would be upset if an ABM system were deployed. Russia would have no choice but to follow suit, thus the result would be an arms race of tremendous magnitude with the only real result being that of waste.[41]

James Reston expressed his conclusions about the United States deployment of an ABM by saying that the proposed deployment does not really cause a crisis in American policy so much as a crisis in the American mind. It is not only a conflict between the scientists of the world and offensive

---

[40]Dyson, p. 17.

[41]Ward, "Another Pearl Harbor?", p. 3.

and defensive weapons but a conflict between power and faith.[42]

---

[42]Reston, p. 14E:4.

CHAPTER IV

CONCLUSIONS AND RECOMMENDATIONS

Conclusions. Most interested persons agree that the United States should have an active defense against the ballistic missile. Whether the defensive system should be an ABM is a question which raises many arguments, as strong opponents and equally strong supporters propound their views. Both groups have developed deliberate patterns from their considerations of factors normally investigated when evaluating a new weapons system.

The proposed ABM system has been subjected to both cost-effective and defense-effective analyses. In order to establish public understanding of the real time position of the ABM, available information is released through all mediums of communications. An objective study of this information has revealed like answers for each factor examined. The indication in each instance was that the present ABM system, if deployed, would result in a definite, although limited, defense-effectiveness. An ABM might well be able to save an attacked city and thus prevent a general holocaust.

Deployment of an ABM system will stimulate international reactions in a number of ways. It is another step in the continuing technological arms race; it enhances the United States national security thus contributing to world peace;

it improves America's defensive posture against proliferation of nuclear weapons; and it fills the requirement for a defensive balance against another nation's deployment of defensive and offensive systems until international controls are established.

Defense weapons always lag behind offense weapons; therefore, continual development and improvement of defensive capabilities are mandatory. Total effectiveness against a massive ICBM attack will probably never be realized; however, this goal could be approached by employing the "building block" concept of ABM development.

Cost-effective analysis of a total ABM deployment indicates the cost would be less than a number of previously employed defensive military systems. Programming the installation and cost over a five-year period would require some adjustment of the defense appropriations. Even if cost-effectiveness dictates a delay in ABM deployment, care must be exercised to recognize that many times, defense-effectiveness is the password to survival and therefore should take precedence over cost-effectiveness as the principal factor in determining whether a defensive system should be deployed.

Deployment of the ABM must be supplemented by the installation of a civil defense system. The estimated cost of a necessary shelter system is approximately equal to the cost of the ABM system. The ABM and a shelter system

could reduce expected casualties by tens of millions of people and save large amounts of natural resources. The value of life in the cost-effectiveness equation is impossible to measure, especially if that life belongs to the individual making the calculations. It is not reasonable to consider that casualties could be eliminated; however, a smaller unit than tens of millions should be the meter of discussion.

If a decision were made to deploy an ABM system, it would have to be a total installation, for the United States public would not understand or endorse a partial protection.

With the number of nations possessing nuclear weapon capabilities continually increasing, it would seem only prudent for the United States to program installation of an ABM system.

Recommendations. An ABM system should have been deployed yesterday, certainly no later than today, and a delay until tomorrow could prove disastrous. A total ABM system with the necessary shelter system should be deployed now with the goal of a completed installation by the end of a five-year period. Research and development of the ABM must be continued with improvements being incorporated through the "building block" concept of updating existing equipment.

BIBLIOGRAPHY

Brennan, Donald G., ed. Arms Control, Disarmament, and National Security. New York: Braziller, 1961.

Brzezinski, Zbigniew and Huntington, Samuel P. Political Power USA/USSR. New York: Viking, 1964.

Buchan, Alastair. NATO in the 1960's: The Implications of Interdependence. New York: Praeger, 1963.

Clemens, Walter C., Jr. Soviet Disarmament Policy 1917-1963. Sanford, Calif.: Sanford University, 1965.

Coffey, J. I. "The Chinese and Ballistic Missile Defense." Bulletin of the Atomic Scientists, December 1965, p. 17-19.

Coughlin, William J. "Soviet May Have Ultimate ABM." Missiles and Rockets, 16 September 1963, p. 15-16.

"The Countdown - LBJ Ponders Modest Nike X Beginning." Technology Week, 2 January 1967, p. 3.

Dyson, Freeman J. "Defense against Ballistic Missiles." Bulletin of the Atomic Scientists, June 1965, p. 12-19.

Gantz, Kenneth F., ed. The United States Air Force Report on the Ballistic Missile. Garden City, N. Y.: Doubleday, 1958.

Getter, Michael. "Soviet ABM Deployment Expected in Year." Technology Week, 20 November 1966, p. 10-11.

Ghadick, T. N. "The Future of the Bomber." Military Review, October 1954, p. 83-88.

Glines, Carroll V., Jr. The Compact History of the United States Air Force. New York: Hawthorn Books, 1963.

Gordon, Authur and Medaris, John B. Countdown for Decision. New York: Putnam, 1960.

Green, Philip. Deadly Logic. Columbus: Ohio State University Press, 1966.

Hahn, Walter F. and Cottrell, Alvin J. "Ballistic Missile Defense and Soviet Strategy." Orbis, Summer 1965, p. 316-337.

Horowitz, Robert S. "Congressmen to Push Nike X despite Johnson's Opposition." Navy Times, 25 January 1967, p. 13.

"ICBM Defense for 50 Cities Urged." The Providence Journal, 10 February 1967, p. 1:1.

Institute for Defense Analysis. Economic and Political Studies Division. Ballistic Missile Defense and Soviet Strategy, by Walter F. Hahn and Alvin J. Cottrell. Arlington, Va.: 1963.

Lenin, Vladimir I. "Report of the Central Committee of the Russian Communist Party (Bolsheviks) at the Eighth Party Congress, March 18, 1919." Selected Works. New York: International Publishers, 1943. v.VIII, p. 26-49.

"Light Anti-Missile System Seen." The Evening Bulletin (Providence, R.I.), 20 December 1966, p. 5:2.

McGuire, Martin C. Secrecy and the Arms Race. Cambridge: Harvard University Press, 1965.

McMahan, R. H., Jr. Rationales for Ballistic-Missile-Defense Policy. Santa Barbara, Calif.: General Electric Co., 1964.

Mezerik, Avrahm G., ed. The Arms Race: Satellites, Missiles, Nuclear. New York: International Review Service, 1957.

"More Signs Point to Nike X Production." Technology Week, 9 January 1967, p. 17.

Morton, Louis. "The Anti-Ballistic Missile." The Virginia Quarterly Review, Winter 1966, p. 28-37.

Parson, Nels A., Jr. Missiles and the Revolution in Warfare. Cambridge: Harvard University Press, 1962.

Public Policy, 1958. Carl J. Friedrich and Seymour E. Harris, eds. Cambridge: Harvard University, Graduate School of Public Administration, 1958.

Reston, James. "Washington: The Paradox of Power." The New York Times, 22 January 1967, p. 14E: 4-8.

Rivers, Mendel L. "Authorizing Defense Procurement, Research and Development and Military Pay." Congressional Record, 14 June 1966, p. 12441-12484.

"Russians Announce Firing Intercontinental Missile 'Huge Distance' to Target." The New York Times, 27 August 1957, p. 1:6.

Schwiebert, Ernest G. History of the U.S. Air Force Ballistic Missiles. New York: Praeger, 1965.

"Senators Ready to Press for Nike X." Technology Week, 12 December 1966, p. 11-13.

Shapiro, Henry. "Khrushchev Invites U.S. to Missile Shooting Match." The New York Times, 16 November 1957, p. 3:4.

"Soviet Fires Earth Satellite into Space: It Is Circling the Globe at 18,000 MPH Sphere Tracked in 4 Crossings over U.S." The New York Times, 5 October 1957, p. 1:1.

"Soviets May Have Ultimate ABM." Missiles and Rockets, 16 September 1963, p. 14-15.

"Soviet Missile Defense Seen." The Providence Journal, 11 November 1966, p. 1:6.

Spanier, John W. American Foreign Policy since World War II. New York: Praeger, 1960.

Stanley, Timothy W. American Defense and National Security. Washington: Public Affairs Press, 1956.

Stone, Jeremy J. "ABM - The Next MLF?" Bulletin of the Atomic Scientists, September 1966, p. 20-21.

"Text of Soviet Announcement on Its Missile Test as Distributed by Tass." The New York Times, 27 August 1957, p. 4.

"Text of White Paper on Defense Issued by British Government." The New York Times, 5 April 1957, p. 1:8, 4:2.

Trainor, James L. "Should U.S. Deploy Nik-X?" Armed Forces Management, August 1965, p. 31-35.

Twining, Nathan F. "Air Force Guided Missile Policy." Army, Navy Air Force Journal, 3 September 1955, p. 1-3.

U.S. Congress. House. Committee on Appropriations. The Ballistic Missile Program. Hearings. Washington: U.S. Govt. Print. Off., 1958.

_____. _____. _____. Department of Defense Appropriations for Fiscal Year 1966. Hearings. Washington: U.S. Govt. Print. Off., 1965. pt. 3

_____. _____. Committee on Armed Services. Military Posture for Fiscal Year 1965. Hearings. Washington: U.S. Govt. Print. Off., 1964.

_____. Senate. Committee on Appropriations. Department of Defense Appropriations for Fiscal Year 1964. Hearings. Washington: U.S. Govt. Print. Off., 1963.

_____. _____. _____. Department of Defense Appropriations for Fiscal Year 1967. Hearings. Washington: U.S. Govt. Print. Off., 1966. pt. 1.

_____. _____. _____. Department of Defense Appropriations for Fiscal Year 1967. Hearings. Washington: U.S. Govt. Print. Off., 1966. pt. 2.

_____. _____. Committee on Armed Services. Civil Defense - Fallout Shelter Program. Hearings. Washington: U.S. Govt. Print. Off., 1963.

_____. _____. _____. Military Implications of the Proposed Limited Nuclear Test Ban Treaty. Hearings. Washington: U.S. Govt. Print. Off., 1963.

_____. _____. _____. Military Procurement Authorization for Fiscal Year 1962. Hearings. Washington: U.S. Govt. Print. Off., 1961.

_____. _____. _____. Military Procurement Authorization for Fiscal Year 1963. Hearings. Washington: U.S. Govt. Print. Off., 1962.

_____. _____. _____. Military Procurement Authorization for Fiscal Year 1966. Hearings. Washington: U.S. Govt. Print. Off., 1965.

_____. _____. _____. Missile and Space Activities. Joint Hearings before the Preparedness Investigating Subcommittee of the Committee on Armed Services and the Committee on Aeronautical and Space Sciences. Washington: U.S. Govt. Print. Off., 1959.

U.S. Dept. of the Army. Army Missiles Rockets. Pamphlet No. 355-13. Washington: U.S. Govt. Print. Off., 1958.

U.S. Dept. of the Defense. Secretary of Defense Semi-annual Report 1 January 1954 to 30 June 1954. Washington: U.S. Govt. Print. Off., 1960.

_____. Secretary of Defense Annual Report 1 July 1959 to 30 June 1960. Washington: U.S. Govt. Print. Off., 1960.

U.S. Navy Dept. Office of the Management Engineer. The United States Navy. Washington: U.S. Govt. Print. Off., 1952.

U.S. President. Public Papers of the President; Harry S. Truman, 1947. Washington: U.S. Govt. Print. Off., 1963.

_____. Public Papers of the President, Harry S. Truman, 1949. Washington: U.S.Govt. Print. Off., 1963.

"U.S. Urges Soviets to Delay Installing New Missile System." "The Philadelphia Inquirer, 20 December 1966, p. 1:6.

Ward, Chester. "Another Pearl Harbor?" Washington Report, 12 December 1966, p. 3.

_____. "Soviet Anti-Ballistic Missile Program." Washington Report, 7 November 1966, p. 2-3.

"Why the Nike-X Was Not Ordered into Production." Armed Forces Management, March 1966, p. 91-96.

"X-Rays to Paralyze Missiles Reported Developed by Soviets." The New York Times, 30 January 1967, p. 10:3.