

**THE ATLANTIC COUNCIL  
OF THE UNITED STATES**

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**Ballistic Missile Defense  
Revisited**

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OCCASIONAL PAPER

**Leon Sloss**

# THE ATLANTIC COUNCIL

## OF THE UNITED STATES

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THE ATLANTIC COUNCIL OF THE UNITED STATES  
10<sup>TH</sup> FLOOR, 910 17<sup>TH</sup> STREET, N.W.  
WASHINGTON, D.C. 20006

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# Ballistic Missile Defense

## Revisited

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### INTRODUCTION

Almost since the first ballistic missile was conceived, U.S. scientists and engineers have sought to develop missile defenses, while politicians, academics and the public have debated the virtues and the evils of deploying such a defense. The debate, which has gone on for decades, continues today. The focus is on four areas:

- What is the threat?
- How well will missile defenses work against the threat?
- Should defenses be limited to preserve strategic stability?
- How much money should be allocated to missile defense?

The current discussion of missile defense has two facets. One is what should be done to defend against short range missiles that are a threat to U.S. forces in the field and many allies. This is usually termed the theater missile defense (TMD) problem. The other set of issues has to do with the defense of the United States against long-range missiles. This is called the national missile defense (NMD) problem. We focus here on the latter issues, but recognize that there are linkages.

The United States has no anti-ballistic missile system operational today. However, there is a major research and development (R&D) program. The funds appropriated in FY 1998 were \$3.7 billion; \$4 billion is requested for 1999. It has been reported that the Clinton administration will increase funding in the coming fiscal year, to include initial funding for deployment of a national missile defense. The program is designed against future threats to the United States, with a goal of being able to develop a deployable system within three years and deploy it in three more years. Each year this target is rolled forward. Some critics of the program would like to see it accelerated; others want to cut back on funding, citing recent failures in the test program and the potential conflict between deployment and the Anti-Ballistic Missile (ABM) treaty. Each year that the program is extended defers deployment, but it also allows ongoing R&D and experience that will benefit the national defense system in the long run.

## BRIEF HISTORY

Early designs for a missile defense system emerged in the 1950s. The first ABM was called Nike Zeus; it was an adaptation of a ground-to-air missile system designed to shoot down manned aircraft. Nike Zeus never was deployed. In 1963 then-Secretary of Defense Robert McNamara authorized the deployment of a more advanced system called Nike-X. The initial deployments of Nike-X were designed to deal with a small attack such as China might have been able to mount at the time. Once Nike-X was approved for deployment it was given a more publicly appealing name, Sentinel, and then Safeguard, once the focus shifted to defense of our intercontinental ballistic missiles (ICBMs). At no time did the United States seek to deploy a defense against a very large Soviet attack, because no system was developed that could convincingly do this job. Eventually, however, one Nike-X site was built in Grand Forks, North Dakota, but the program was abandoned in 1975, well before the total contemplated system was completed. The ABM treaty contributed to the demise of the Safeguard program.

In 1972 the ABM treaty was signed by the United States and the Soviet Union in conjunction with the SALT I agreement, which sought to cap the rapid expansion of nuclear weapons on both sides. The two linked agreements reflected the dominant strategic theory of the time, often called mutual assured destruction (and demonized by its critics by the acronym MAD). Nuclear deterrence, in this view, was achieved by the threat of massive retaliation against targets of high value to the other side. By this theory, limits on defensive systems, and particularly on ballistic missile defenses, were essential to the limitation of offensive forces, for unless defenses were limited the other side would have to respond, and even anticipate, threats to the interception of its offensive forces, and would therefore retain existing forces and build more or more sophisticated offensive forces to offset the defense, thus perpetuating an arms race.

Under the ABM treaty each side was permitted to deploy missile defenses at two sites, one of which could be at the national capital. The Soviet Union already was building a defense around Moscow when the treaty was signed. The United States subsequently deployed the Nike-X system at one site in North Dakota, which was intended to be part of a thin defense mainly to protect nearby ICBMs. For a variety of reasons this defensive system never was completed. In 1976 the United States and the Soviet Union agreed to modify the treaty to limit each side to one site. The treaty has been reviewed regularly at five year intervals and remains in force today, essentially as it was written in 1971. However, in 1995 the two sides agreed to new treaty interpretations designed to permit the development of theater missile defenses within the terms of the existing treaty.

In 1983 President Reagan restored interest in ballistic missile defense when he announced the Strategic Defense Initiative (SDI), dubbed Star Wars by the media. This was to be a major effort to develop a nationwide defense system and ultimately to replace the emphasis in U.S. strategy on the threat of nuclear retaliation with the possibility of a robust defense. President Reagan's proposal ignited a renewed debate about missile defense. Supporters hailed the defensive emphasis as more moral than the reliance on devastating nuclear threats. They saw it as an opportunity to take advantage of U.S. superiority in technology. Skeptics questioned the feasibility of developing such a defense. Many were appalled at the prospective cost of at least tens of billions of dollars. Supporters of arms control saw SDI as a threat to the ABM Treaty and to the stability of the U.S.-Russian nuclear relationship. After Reagan left office and the Cold War came to an end, enthusiasm for the Strategic Defense Initiative waned, but a substantial R&D program remains as the legacy of Star Wars. This is the program that we have today.

## DEFENSE EFFECTIVENESS AND STABILITY

Two concepts have been extremely important in the ABM debate over the years. They are "effectiveness" and "stability." The effectiveness of various postulated defenses is constantly debated by experts. To the layman it seems surprising that there should be so much disagreement over how well a defense will work. However, it must be recognized that most of these debates are about "paper" defense systems that have never been built and "paper" countermeasures that have never been tested. Thus, it is relatively easy for advocates of a given defense to postulate a set of circumstances in which the defense works well and for opponents of the system to postulate offensive countermeasures, such as decoys, that can easily defeat the system— on paper. Furthermore, the contestants in the debate are often vague as to what the system must be expected to do. Opponents of defense tend to argue that defenses must be perfect to be useful. Advocates of defense set less demanding goals. Some argue that a defense, even if it cannot work perfectly, increases the uncertainty of an attacker in carrying out a successful attack, thereby helping deter an attack. One problem is that even a "perfect" defense will allow some leakage— e.g., five percent. With five percent of a very large number of very destructive nuclear warheads getting through, the penalty is very high. By comparison, in the U.S. invasion of Okinawa during World War II, 92 percent of the kamikaze were shot down. But the other eight percent took approximately one third of the invasion fleet out of action. It also is argued that offensive planners can create countermeasures, such as light decoys, that can penetrate or confuse the defense much more easily and cheaply than the defense can counter the offense, but defense advocates argue that light, inexpensive decoys can be discriminated and thus cannot be relied upon by offense planners.



Stability is another elusive term. During most of the Cold War, U.S. deterrence strategy was based on the threat of massive retaliation. The Soviets sometimes talked more about using nuclear weapons to fight and win a war, but the heart of their deterrent also was the prospect of massive retaliation. If an effective defensive system could be deployed it would bring into question the ability to retaliate and thus “de-stabilize” the strategic equation. Specifically, if one side had a defense that might deal with a portion of his adversary’s force he might be more inclined to strike first in a crisis, assuming that he might then be able to defend against the residual forces of his enemy. If either side saw defenses emerging that would threaten its deterrent it would make efforts to offset this potential advantage by building more weapons, or by building more sophisticated weapons (i.e., with decoys or multiple warheads). In this way the deployment of defenses, or even the prospect of deployment, could lead to increased arms competition. Such considerations led to the ABM Treaty. While this view of stability was prevalent in the 1960s and 1970s, it was not universally accepted, and it was seriously challenged by President Reagan’s Strategic Defense Initiative.

### *WHAT IS THE THREAT ?*

The potential ballistic missile threat to the United States now comes from several sources, and missiles could carry nuclear, chemical, biological or even high explosive warheads. The major ballistic missile threat remains that from Russia. While the use of that force is far less likely today than during the Cold War, Russia still retains several thousand long range ballistic missiles and warheads. Should even a substantial fraction of that force be launched, there is no defense that could prevent overwhelming damage to the United States. Fortunately, such a large scale attack no longer seems likely in the new political environment. We continue to rely on the threat of retaliation to deter such a remote possibility. Unfortunately, the possibility of an accidental launch of a Russian missile may have increased due to the deterioration of the Russian economy and the resultant chaos in the military, notably the erosion of the Russian early warning system and the military command and control over their nuclear forces. Experts differ on how bad the situation is in Russia. While few U.S. experts believe that a nuclear accident is likely, there is considerable concern that an accidental launch is more likely now than in the past—far more likely than a deliberate attack. Such a launch probably would involve only a few missiles, and it appears possible to create an effective defense against such a limited threat.

China presents a somewhat different threat. China never has sought to create a large nuclear force, and it still has only a handful of long range missiles that could reach U.S. territory (17+ according to IISS, *The Military Balance*). While a nuclear confrontation with China seems unlikely, a Chinese official did make a verbal nuclear

threat against U.S. cities during the most recent crisis in the Taiwan Strait in March 1996. China indicated that it intends to remain a nuclear power as long as the United States and Russia retain nuclear weapons, and it has the capability to expand and modernize its nuclear forces should it choose to do so. Future conflicts with China in East Asia cannot be ruled out, and nuclear weapons could come into play, for example if China sought to seize Taiwan and U.S. opposition led to a serious U.S./Chinese military confrontation.

However, the subject receiving the greatest attention of late is the missile threat from other nations. *The main question is how soon such a threat might emerge.* The U.S. intelligence community contends that such a threat is at least a decade away, and it is on this intelligence estimate that the pace of the current research and development program for missile defense is based. In 1997, a high level government commission, headed by former Secretary of Defense Donald Rumsfeld, reached more pessimistic conclusions. They criticized the intelligence estimates for assuming that new entrants in the missile field would necessarily follow the same slow, deliberate pattern of development followed by the United States and Russia. They concluded that these new entrants, such as North Korea, Iran and Iraq, might well seek ways to shortcut the development process, and the United States might not be aware of new developments for several years. They concluded that the warning time which the United States might have to respond to new threats might be three or four years rather than eight or ten. Intelligence experts have acknowledged that such shortcuts were possible, but argued that their job was to sift through the possibilities and come up with their best estimates. They have stuck with their prior estimates. Of course, those who have long argued for accelerating the U.S. R&D program seized on the Rumsfeld Commission report to call for more BMD funding and an accelerated effort to deploy a system. The August 31, 1998 test launch of a missile by North Korea over Japan fueled such concerns.

### *HOW WELL WILL MISSILE DEFENSE WORK ?*

In several tests a defensive missile has intercepted an attacking missile. However, these have been controlled tests, usually involving only one attacking missile. An effective ABM system would have to do much more than that— to hit a number of incoming missiles when the attacker is seeking to disguise them. If a defense is deployed, it would have to be assumed that an attacker would seek means to confuse the defense by deploying decoys that would look like incoming warheads or chaff to hide the warheads until very late in their trajectory. Experts have argued vigorously for years how easy it would be to design and build such penetration aids and how costly it would be to defend against them. The defensive system also should be able to cover the entire country, including Alaska and Hawaii.

Today three broad types of defense are being studied, and in some cases, developed:

*Terminal defense* intercepts incoming missiles at fairly low altitudes, i.e. within the atmosphere. This was the original concept of Nike Zeus and Nike-X. Low altitude intercept takes advantage of the atmosphere to filter out light objects and help distinguish the incoming warhead from lighter penetration aids designed to mask the warhead. However, a terminal defense covers a relatively small area, and while appropriate for TMD, many sites would be required to cover the entire country for NMD. The high cost of such a defense and the limitations of the ABM treaty on the number of permitted sites have turned designers towards other solutions.

*Mid-course defense* intercepts the incoming missiles at very high altitudes outside the atmosphere. Very early mid-course intercept may permit destruction of the threat before decoys are deployed and one installation can cover a much wider area on the ground. However, once the warheads and penetration aids are deployed from the incoming missile it is difficult to pick out and attack the warhead in space. Thus, a mid-course system would probably require back-up from a terminal system.

*Boost phase defense* would intercept the missiles just after launch while they are still in their upward flight. Such a defense would have to be based in space. From a technical point of view it is the most difficult type of defense to develop, but it also has the potential for being the most effective. Missiles in powered flight are easy to distinguish because of the heat signatures of their engines. If the missiles can be destroyed during the boost phase, before the warheads are deployed, then all the warheads and penetration aids also are destroyed. Boost phase defenses could be effective against ballistic missiles directed at a wide geographic swath of targets. They also could be effective against some missiles of less than intercontinental range.

Tests have demonstrated the capability to carry out terminal defense against a few objects under controlled conditions, but more sophisticated applications have yet to be proven. Recent tests of the newest U.S. system, Theater High Altitude Area Defense System (THAADs) have not been very encouraging. There have been a series of failures, leading skeptics to question the feasibility of developing a broad area defense. Supporters of the system argue that failures are not surprising in early tests of a new, complex system. Meanwhile, some have considered the Navy's systems to be more promising, yet the Navy Upper Tier system has not yet been tested. The administration has made no commitment to deployment, but is committing substantial resources in an effort to determine whether deployment is feasible.

## *WHAT DO WE WANT BMD TO DO ?*

How well a missile defense will work and what it will cost depends on what we want it to do and against what sort of threat. At one end of the scale, we know that a defensive system can intercept one or a few incoming warheads if they are within range of the defensive missiles and have no or simple decoys. At the other extreme, it cannot be expected that a missile defense will be perfect against a large attack.

In the 1960s the Nike-X was designed to defend against small attacks such as China was then capable of launching. In the 1980s the SDI system was conceived to deal with much larger attacks, but the feasibility of such a defense was never proven. Also, it depended on deployment of all three tiers to reduce successively the attack to low levels by a defense in depth. Supporters of that defense argue that not enough effort was devoted to the goals of SDI. Opponents contend that a defense of such magnitude and complexity is not feasible and would lead to unbridled arms competition. Or, if it were feasible, it would be impossibly expensive in relation to the cost of the attack.

The present concept is to defend against small scale missile attacks, i.e., against a Russian accident, or China, or a small state with a few ballistic missiles. In this respect, the goals are more like those of the 1960s, but the technology now available is far more sophisticated. Still, the same debates persist as in the past. Skeptics say that if we deploy a defense the attacker will find ways to evade it. For example, an attacker can use another mode of attack such as cruise missiles which can evade the radar of a ballistic missile defense system. Terrorists, using unconventional means of delivery, can deliver a nuclear, chemical or biological weapon by clandestine means. Proponents of the current program acknowledge that ballistic missile defenses can only defend against one type of threat, but emphasize that ballistic missile threats to the United States are real and growing, and failure to defend can open the United States to blackmail, even from small states that possess WMD. Others argue that the threat of massive retaliation might work even more powerfully against a small state with few weapons

## THE ABM DEBATE

An integral part of the long running BMD debate has been over the value of the ABM treaty which, in turn, reflects sharply differing views about U.S. nuclear strategy.

Supporters of the ABM treaty cite it as the most successful nuclear arms control agreement of the Cold War, and are convinced of its continuing relevance today as a major barrier to arms competition. Without it, we would face a much larger threat in terms of deployed Soviet/Russian nuclear weapons. To these supporters, it is an important symbol and guarantor of strategic stability. They express concern that any major changes to the treaty could severely disrupt relations with Russia at a time when we have moved into a cooperative mode on many nuclear issues and would cause Russia to abrogate START II, setting back arms control severely. Changes to the treaty also are opposed by our nuclear allies, France and the United Kingdom, who fear that any major deployment of missile defenses by Russia will make their own very limited nuclear deterrents ineffective.

To critics, the treaty is an obsolete product of the Cold War, where the major concern was U.S.-Soviet competition and how to curb it. Today we are in a different strategic setting. There is no current threat of arms competition from a Russia that is economically weak, and unable to maintain its current forces adequately. In this view, the most likely nuclear (and chemical and biological) threat comes from so-called "rogue" states, such as Iran, North Korea and Iraq, which supposedly still retains them, and may target Israel, or U.S. forces in Saudi Arabia.<sup>1</sup> The critics see the ABM Treaty as an obstacle to the creation of effective defenses against this new threat. In the short term, the treaty places constraints on development of the most advanced theater defenses, particularly those that might require space-based components. In the longer run, critics are convinced that the treaty will have to be modified or abrogated in order to build a needed defense of the United States.

## CONCLUSION

It is clear that those who support a more aggressive missile defense program see the ABM treaty as an obstacle to their goals; and those who support the ABM treaty see national missile defenses as a threat to strategic stability. These are two very different perspectives about the role of missile defense, of nuclear weapons and of nuclear strategy. Both views see nuclear weapons, and other weapons of mass destruction, as a major continuing threat, and ballistic missiles as a potent means for delivering such a threat. However, in one view, the answer to the threat lies in verifiable agreements that eliminate or sharply reduce ballistic missiles and the mass destruction weapons they could deliver. In this view, defenses will stimulate offensive counteractions and undermine any incentive to reduce offensive arms. If, eventually, offenses can be completely eliminated there will be no need for defenses.

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<sup>1</sup> Iraq's retention of a nuclear weapons capability is less certain than its possession of biological and chemical weapons, though the potential to build in the future remains.

The alternative view is far more pessimistic about the prospects for arms control. In this view, ballistic missiles will continue to be a threat to the United States, its overseas forces and its allies, and arms control is not likely to be an effective curb. Therefore, the best possible defense is needed both for U.S. forces abroad and for sovereign U.S. territory. An obsolete arms control agreement should not be allowed to stand in the way of technological progress.

In theory, these two views should be reconcilable. Both are based on the recognition of a potential ballistic missile threat. However, the same essential views have been the basis of a growing debate about missile defense that has raged for decades. Barring an effort to give on both sides, it does not seem likely that these views will converge soon. Meanwhile, the progress of missile defense is likely to be determined by the success or failure of future tests, and by the costs of development, deployment and continuous upgrading. Also, battles over defense budget allocations will be influenced by perceptions of the full range of potential threats, not only missile attacks.

Nevertheless, potential for reconciliation is possible over the longer-term, despite fundamental conflicts over BMD, themselves rooted in conflicting views about strategy and arms control. Those in the United States who believe that the ABM treaty is inviolable need to accept some modifications to the treaty to permit the deployment of advanced TMD and at least a modest NMD. Those who want to overthrow the ABM treaty and rapidly expand resources committed to defense need to accept modification of the treaty as a goal, rather than its abrogation. And they need to accept the logic of a measured development program that does not start throwing money at the problem until tests demonstrate the feasibility of the systems in question. The U.S. government should develop an overall approach to the WMD threat that would put the ballistic missile threat into context, and which would develop an overall response to that threat, of which BMD is a part.

Finally, there is the hard problem of dealing constructively with Russia and China on ballistic missile defense and related issues. The United States is in a strong bargaining position due to our superior economic resources, advanced technology and military power. We could proceed unilaterally with a missile defense program without regard to the concerns of others, but this would be a great mistake. Russia considers the ABM treaty to be important, not the least as protection against a new arms race with the United States which it cannot afford. China is concerned with U.S. security cooperation with Japan, including on theater missile defense. These two nuclear powers, as well as the United States' major allies, must be fully involved in discussions of longer-term strategic relationships, namely the impact of BMD on the evolving offense/defense equation and future strategic arms reductions.

## ABOUT THE AUTHOR

Leon Sloss served for over 30 years in the U.S. government in various positions in the Departments of Defense and State. He is a former Assistant Director of the U.S. Arms Control and Disarmament Agency, and from 1978-79 he was the Director of the Nuclear Targeting Policy Review in the Department of Defense. He also has held positions at SRI International, the Center for Strategic and International Studies and the International Institute for Strategic Studies. He has served on several government advisory committees, including the Scientific Advisory Group to the Commander-in-Chief, Joint Strategic Target Planning Staff, U.S. Strategic Command, and the Nuclear Concepts Working Group of the Defense Nuclear Agency.