LAWYERS ALLIANCE FOR WORLD SECURITY

WHITE PAPER ON NATIONAL MISSILE DEFENCE

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Table of Contents

Letter from the President of LAWS *Thomas Graham, Jr.*		p. 1
List of Acronyms		p. 2
Introduction p. 3		
Chapter I	**The U.S. NMD Program**	p. 5
George Lewis		
	Box 1.a – Is the NMD Technology Ready to Deploy?	p. 6
	Box 1.b – NMD Timeline	p. 8
Chapter II	**Will NMD Work?**	p. 11
George Lewis		
	Box 2 – The Cost of NMD	p. 14
Chapter III	**The Ballistic Missile Threat**	p. 17
Joseph Cirincione		
	Box 3.a – Confusion over the Nature of the Threat	p. 18
	Box 3.b – Can the U.S. be Deterred?	p. 21
Chapter IV	**The Impact of NMD on the ABM Treaty**	p. 27
Jack Mendelsohn		
	Box 4 – When Does the United States Violate the ABM Treaty?	p. 30
Chapter V	**The Strategic Impact of NMD**	p. 33
John Steinbruner		
	Box 5.a – Letter from Senator Lott on NMD	
	Box 5.b – The Allies and NMD	
	Box 5.c – The Effect of NMD on Proliferation	
Chapter VI	**Alternatives to NMD**	p. 41
Steve Fetter & Jack Mendelsohn		
	Box 6.a – What about Undeterrables?	p. 41
	Box 6.b – NMD and Accidental or Unauthorized Launch p. 43	
	Box 6.c – The Criminalization of Chem-Bio Weapons	p. 45
Biographic Notes		p. 48
On-line Bibliography		p. 49

Message from the President of LAWS

The proposed deployment of a national ballistic missile defense (NMD), the impending destruction of the ABM Treaty, the potential for alienating Russia and China from the arms control process and the alarmed reaction of our NATO allies loom as fundamental, near-term challenges to U.S. security. This, coupled with the Senate's rejection of the Comprehensive Test Ban Treaty (CTBT), prompted the Board of Directors of the Lawyers Alliance for World Security (LAWS) to approve unanimously a series of White Papers. These papers are intended to bring key issues in national security, arms control, non-proliferation and disarmament to the attention of policy makers and the public and to provide for a more informed discussion.

This White Paper, the first in that series, examines the issue of national missile defense and its impact on U.S. security. Other White Papers will follow on the CTBT, the role of nuclear weapons and deterrence in the 21st century, and the importance of multilateral arms control efforts to U.S. national security. The Board considered these four topics as priority questions requiring full public debate if a coherent national security strategy is to be developed.

It was the sense of the LAWS Board that the principal arguments in favor of deploying a national missile defense had not been adequately examined and that the justifications put forward for the program raised many unanswered questions. The technological, political and strategic arguments against a national missile defense put forward in this White Paper – that the system can be foiled by relatively unsophisticated countermeasures, that it will interfere with international efforts to stem proliferation and that it will destabilize our relations with China and Russia – strongly reinforce the many doubts that have surrounded the NMD program since its inception.

I would like to thank Joseph Cirincione, Steve Fetter, George Lewis, Jack Mendelsohn and John Steinbruner, the authors of the NMD White Paper chapters, for their hard work and insightful analysis. In addition, thanks again to Jack Mendelsohn for his work as editor, to Matthew Bunn for his help as consulting editor, and to Alex Slesar and Damien LaVera, senior program officers at LAWS, for their editorial assistance.

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Ambassador Thomas Graham, Jr.
President
Lawyers Alliance for World Security

List of Acronyms

ABM Treaty – Anti-Ballistic Missile Treaty
BMD – Ballistic Missile Defense
BMDO – Ballistic Missile Defense Organization
BTWC – Biological and Toxin Weapons Convention
BW – Biological Weapons
C-1, C-2, C-3 System – Stages of deployment in the NMD program
CDC – Centers for Disease Control
CFE Treaty – Conventional Armed Forces in Europe Treaty
CIA – Central Intelligence Agency
CNN – Cable News Network
CW – Chemical Weapons
CWC – Chemical Weapons Convention
DRR – Deployment Readiness Review
DSP – Defense Support Program satellites
EKV – Exoatmospheric Kill Vehicle
GBI – Ground-Based Interceptors
GHz – Gigahertz
HEU – Highly Enriched Uranium
ICBM – Intercontinental Ballistic Missile
IFICS – In-flight Interceptor Communications System
INF – Intermediate-Range Nuclear Forces
IRBM – Intermediate-Range Ballistic Missile
KG – Kilogram
KM – Kilometer
MIRVs – Multiple Independently-Targetable Reentry Vehicles
MRBM – Medium-Range Ballistic Missile
MTCR – Missile Technology Control Regime
NIE – National Intelligence Estimate
NMD – National Missile Defense
NPT – Treaty on the Non-Proliferation of Nuclear Weapons
NWFZ – Nuclear Weapons Free Zone
RV – Reentry vehicle
SALT – Strategic Arms Limitation Talks
SAM – Surface-to air missile
SBIRS-High – Space-based Infrared System – High earth orbit
SBIRS-Low – Space-based Infrared System – Low earth orbit
SDI – Strategic Defense Initiative ("Star Wars")
SRBM – Short-Range Ballistic Missile
START – Strategic Arms Reduction Treaty
SLV – Space-Launched Vehicle
THAAD – Theatre High Altitude Area Defense
TMD – Theater Missile Defense
U.K. – United Kingdom
U.S. – United States
USSPACECOM – United States Space Command

UEWR – Upgraded Early Warning Radar
WMD – Weapons of mass destruction

Introduction

In the fall of 2000, the United States will decide whether or not to begin deployment of a national missile defense (NMD) system. This White Paper reviews the technological aspects of the U.S. NMD program as well as its political and strategic impact and concludes that the current system, if deployed, would result in a net decrease in U.S. security.

There are compelling reasons for this conclusion. First, as currently designed, the U.S. NMD system will be vulnerable to relatively unsophisticated countermeasures. Second, the primary justification for NMD – the potential long-range ballistic missile threat – has been exaggerated. Third, the current U.S. NMD program, if fully realized, will gut the ABM Treaty, jeopardize strategic stability and weaken the non-proliferation regime. Fourth, U.S. NMD deployments will impede further significant nuclear weapons reductions by Russia and force Moscow to rely more heavily on dangerous rapid reaction command and control procedures. Fifth, U.S. NMD deployments will drive China away from arms control negotiations, provoke an increase in the scale of its on-going strategic force modernization, and bring Beijing to question the legitimacy of all space-based activities. Finally, NMD deployment will undercut alternative approaches to combating proliferation, such as arms control (including transparency measures), economic incentives, cooperative programs and export controls, all of which enjoy international support and legitimacy.

Chapter I, by George Lewis, describes **The U.S. NMD Program**. The proposed NMD system would use 20 to 250 ground-based interceptors deployed initially at one site, and eventually at two, supported by an extensive network of ground-based radars and space-based infra-red sensors. The system uses impressively advanced technology, and is intended to provide a highly effective defense of all fifty states against small-scale attacks by ICBMs.

Chapter II, also by George Lewis, asks the question **Will NMD Work?** The U.S. NMD system, designed to intercept ballistic missile warheads outside the atmosphere, has vulnerabilities. It can be "*underflown*" by shorter range ballistic and cruise missiles. It cannot protect against *submunitions* designed to disperse chemical and biological agents. Moreover, the system will never be tested in anything remotely resembling a realistic, stressful battle environment and any shortcomings would not be evident until it is too late. Finally, the current U.S. NMD system can be defeated by numerous and relatively unsophisticated *countermeasures* specifically designed to spoof, overload or confuse the system.

In Chapter III, Joe Cirincione addresses **The Ballistic Missile Threat**. Supporters of NMD claim that it is necessary to deploy a national missile defense to protect the nation from ballistic missile attacks by "rogue" states. However, almost all of the nations that possess ballistic missiles have only short-range missiles. *Only six nations have medium-range missiles over a 1000-km range. Only four of these nations* – India, Pakistan, North Korea and Iran – *have active programs for developing intermediate-range missiles of over 3,000-km in the next 10 years.*

China and Russia are the only potential adversaries with the capability to hit the United States with nuclear-armed ICBMs. The North Korean missile program is primitive by world standards, not capable of sustaining multiple launches of missiles, and of limited military utility. To develop a long-range ballistic missile, the North Koreans would have to make remarkable progress in propulsion, guidance, airframe, warhead and reentry vehicle technology. There is no evidence that North Korea has mastered these techniques, only speculation that it might do so.

Jack Mendelsohn, in Chapter IV, outlines **The Impact of NMD On The ABM Treaty**. It is not possible to "amend" the ABM Treaty to permit full deployment of the proposed U.S. NMD program without totally gutting the agreement. The current program is directly contrary to the Treaty's fundamental objective, would violate virtually every one of its limiting provisions and would render its basic restrictions a dead letter. This is also true for the "other promising missile defense technologies," mentioned by Senator Lott in his April 2000 letter to President Clinton. Proposals such as those put forward by Senator Lott and others for a multi-layered NMD based on land, sea, air and space-components would be completely inconsistent with any kind of agreed constraints.

Russian officials are concerned that the United States will create an NMD infrastructure of upgraded or newly deployed ground-based radars and space-based sensors. This would provide a "*base*" for a territorial defense from which the United States could "*breakout*" with additional NMD deployments as well as link to highly capable theater missile defense systems. China, for its part, cannot allow its retaliatory capabilities – approximately 20 warheads – to be neutralized by the U.S. NMD system. Thus, an NMD program ostensibly to counter a threat of 20 (presently non-existent) North Korean warheads is likely to provoke a Chinese deployment of several hundred long-range, strategic warheads.

Chapter V, by John Steinbruner, reviews **The Strategic Impact of NMD**. The Russian nuclear military establishment is deteriorating and its early warning system is in disarray. That combination of circumstances will intensify Russian reliance on rapid reaction procedures (launch-on-warning) to protect its residual force against preemptive destruction and will also degrade the capacity to manage those operations safely. Even a limited U.S. NMD deployment that the Russians agreed to accept would reinforce that perverse effect and assure that NMD does far more harm than good in terms of its impact on operational procedures and the stability of the overall strategic relationship.

China has made it clear that, if the United States proceeds with NMD, it will be uncooperative in all multi- and bilateral arms control fora. Moreover, China has pointedly warned that the full array of commercial and military support activities in space do not rest on an explicitly established legal foundation and that these heretofore accepted activities would be highly objectionable in the context of the projected U.S. NMD program

In Chapter VI, Steve Fetter and Jack Mendelsohn outline **Alternatives to NMD**. There exists an effective alternative to NMD for dealing with the potential ballistic missile threat: strengthening the interlocking and complementary barriers to proliferation created by deterrence, arms control (including transparency measures), economic incentives, cooperative programs, export controls, preemption and civil defense.

This alternative has significant advantages over NMD. First, its component parts are already in place, have a record of success, and benefit from large-scale international political, financial and technical participation. Second, elements of the alternative approach – such as transparency measures, civil defense and criminalization – are applicable against a broader spectrum of threats than NMD, including non-identifiable actors and short-range delivery systems. Third, most of the component parts of this approach are mutually reinforcing and universally viewed as legitimate efforts to strengthen global security.

The U.S. NMD program, on the other hand, is viewed by many governments, both friendly and critical, as a retreat by the United States from international efforts to constrain the threat of proliferation, as undercutting arms and export control agreements and as disrupting key strategic relationships. As a result, deployment of the proposed U.S. NMD program, or any of the even more ambitious proposals, will jeopardize vital support for many of the valid alternatives for dealing with the threat of ballistic missiles and weaken existing, carefully constructed barriers to proliferation

Chapter I

The U.S. NMD Program

George Lewis

Introduction

In the fall of 2000, the Clinton Administration is scheduled to decide on whether or not to begin immediate deployment of a National Missile Defense (NMD) system. This NMD system is intended to provide a highly effective defense of all fifty states against small-scale attacks by intercontinental-range ballistic missiles (ICBMs). The primary argument made for immediate deployment is the possibility that emerging missile states hostile to the United States, such as North Korea, Iran or Iraq, might soon acquire ICBMs and use them to attack (or threaten to attack) U.S. territory. The possibility of an accidental or unauthorized missile launch by Russia and the existence of a small Chinese ICBM force serve as secondary justifications.

The upcoming deployment decision is not an abstract debate over the merits and demerits of NMD. Rather it is a decision on whether or not to begin deployment of a specific missile defense system, most of the components of which are already developed and undergoing testing.

The proposed NMD system would use ground-based interceptors (GBI) deployed initially at one site, and eventually at two sites, supported by an extensive network of ground-based radars and space-based infrared sensors. It uses impressively advanced technology, and necessarily so. At the same time, however, it has vulnerabilities which indicate that it is susceptible to defeat by relatively straightforward countermeasures.

This chapter will first describe the various components that make up the proposed NMD system, and show how they work together to form an integrated defense system. The chapter will then lay out the overall architecture of the system and how it is expected to evolve over time.

Components of the NMD system

The proposed U.S. NMD system will consist of a relatively small number of key components.

Space-based Early Warning Satellites

The first indication of a missile launch against the United States would come from early warning satellites deployed in geosynchronous orbits about 36,000 km above the equator. The current DSP (Defense Support Program) early warning satellites will detect an ICBM within roughly a minute of its launch, and will continue to observe it until the rocket booster burns out several minutes later. They will provide the defense with the missile launch location as well as some rough trajectory information.

In about 2004, a new generation of early warning satellites, known as SBIRS-High (Space-Based Infrared System – High Earth Orbit), with improved accuracy and sensitivity, will begin to enter service. Since early warning satellites have important monitoring functions aside from their potential NMD role, SBIRS-High will be deployed even if the NMD system is not.

Ground- and Space-based Sensors

After the missile rocket engines have stopped burning, other NMD sensors take over and detect and track the warhead (or warheads) as well as discriminate the warhead from any missile debris, decoys or other objects produced by the missile. These sensors are the key to the real-world effectiveness of the NMD system, and include new X-band ground-based phased-array radars, upgraded versions of existing early warning radars, and a space-based missile tracking system.

[redacted]

as far as possible in the limited time – roughly 15 minutes – available. The GBI is reportedly capable of accelerating its EKV payload to a speed of 7 to 8 kilometers per second (15,700 to 17,900 miles per hour).

The EKV will use heat-sensitive infrared sensors and a visible light sensor to detect and home in on an attacking warhead. Following its release from the GBI, the EKV will coast through space and search for its target until it detects it, potentially at a range of 1,000-km or more. Using small rocket thrusters, the EKV will maneuver itself onto a collision course with the target. If the command and control system, using data from the X-band radars and SBIRS-Low satellites, has not been able to discriminate the target from decoys or other countermeasures, then the EKV itself will attempt to do so using its sensors. If successful, the EKV will collide with its target at a speed of up to 15 kilometers per second (34,000 miles per hour), destroying both itself and the attacking warhead.

In order to maximize the probability of a successful intercept, the NMD system will fire one or two interceptors at each attacking warhead. If timelines permit, the system may then observe the results of the intercept attempts and if necessary fire additional interceptors. If time does not permit the use of this "shoot-look-shoot" strategy, the defense may simply fire a single salvo of four or five interceptors against each incoming warhead.

Architecture and Timetable
As recently as a year ago, the Ballistic Missile Defense Organization (BMDO) envisioned deploying the NMD system in three phases.[1] The first phase, known as the Capability-1 (C-1) system, was intended to counter an attack by a "few, simple" warheads (meaning five or less) and would have deployed 20 interceptors in Alaska. The C-2 system, intended to counter an attack by a "few, complex" warheads, would have deployed 100 interceptors and was nominally scheduled for about 2010. The ultimate goal of the BMDO deployment plan (and thus known as the "objective system") was the C-3 system. It was scheduled for about 2015, would have deployed 200-250 interceptors at two sites and was intended to be able to counter an attack by "many, complex" warheads.

[redacted]

the Treaty in the near future or, perhaps, giving the required six months notice of intent to withdraw from it (see Box 4 and Chapter IV). On the other hand, if the NMD test program continues to produce failures, a decision to deploy could be delayed until next year.

Under the Clinton Administration's plan the NMD system would likely be completed by about 2010, assuming a decision to deploy was made in 2000. Although the precise architecture of the final system has not yet been firmly determined, it would likely be similar to the BMDO's proposed C-3 system. Interceptors would be deployed at two sites, in Alaska and North Dakota, with 100 to 125 interceptors at each site. Along with the five upgraded early warning radars, up to nine X-band radars would be deployed, one at each interceptor site and at each UEWR site, and one each in Hawaii and South Korea (a new UEWR might also be deployed in South Korea). The SBIRS-Low space-based missile tracking system would also be an integral part of the NMD system's sensor network.

Although this C-3 system is the current deployment goal, the NMD system is explicitly designed to be compatible with future upgrades and expansions beyond the C-3 level. Most importantly, the NMD system will put into place a full sensor infrastructure capable of supporting a much larger system. Possible upgrades include the deployment of more interceptors, an increase in the number of interceptor launch sites, and the deployment of space-based weapons, such as the Space-Based Laser. The NMD system could also be rapidly expanded by linking to it high-altitude theater missile defense interceptors, such as those for the Navy Theater-Wide system.[3]

The Congressional Budget Office recently estimated that the acquisition and operating costs for the first phase of the NMD system (with 100 interceptors in Alaska) would be $29.5 billion through the year 2015. Upgrading the capabilities of the first site to 125 interceptors and acquiring and operating a second site, for a total of 250 interceptors, would raise the cost to $48.8 billion. Another $10.6 billion would have to be spent to build and operate the SBIRS-Low satellite system. These cost estimates will almost certainly increase over time (see Box 2).

Conclusion

The proposed U.S. NMD system, if deployed, would be one of the most advanced and complex weapon systems ever developed. The system would entail the construction or upgrade of a complex and geographically disparate array of facilities and components stretching from South Korea to the U.K., an economic and technological endeavor of enormous magnitude. Before assessing whether the effort and expense is worthwhile, a wide variety of technological, political and strategic factors should be considered. These factors are discussed in the succeeding chapters.

[3] BMDO, *Summary of Report to Congress on Utility of Sea-Based Assets to National Missile Defense*, June 1999.

Chapter II

Will NMD Work?

George Lewis

Introduction

If the proposed U.S. NMD system is to have any possibility of enhancing U.S. security, it must work, and work well. A system that was widely understood to be ineffective would clearly be of little value. Alternatively, a system believed to be highly effective, but that is in reality seriously flawed, could create a highly dangerous situation if, for example, the United States believed its NMD system afforded it freedom of action against missile-armed adversaries. Thus it is essential not only that the proposed NMD system be highly effective, but that U.S. leaders have an accurate understanding of its likely effectiveness. This chapter will discuss the limitations of the system and its vulnerability to countermeasures.

Scope of the NMD system

Even if the proposed U.S. NMD system works perfectly, it will not immunize the United States from attacks with weapons of mass destruction. This is because the NMD system is not intended or able to defend against delivery means other than ballistic missiles. As a result, other less technologically demanding, more reliable and more likely delivery means, such as smuggling, cruise missiles, or small civilian aircraft or ships could still threaten the United States.

However, what is less well understood is that there are actually many ballistic missile threats that the system is intrinsically incapable of intercepting. As the 1998 Report of the Rumsfeld Commission noted (see Chapter III), it would be easier and quicker for an emerging missile state to deploy already-existing shorter-range missiles on ships than to develop ICBMs.[4] The proposed NMD system could not even attempt to intercept such short-range missiles.

The U.S. NMD system also could not defend against ICBMs armed with chemical or biological agents. In order to disperse these agents over a large area, an adversary would likely package them into numerous small submunitions (up to 100 or more), and dispense them as soon as the missile's boost-phase ends (i.e., after the rocket motors finish firing). This approach would defeat the NMD system by overwhelming it with more targets than it could hope to intercept.

Finally, if potential adversaries believed that the U.S. NMD system might successfully counter their ICBMs, they might be tempted to transfer their threat to other targets. Thus a U.S. NMD system, whether effective or not, might drive adversaries to use the one type of weapon the NMD system is intended to counter – nuclear-armed ICBMs – against overseas U.S. military bases and the foreign cities which would not be covered by the proposed system. This scenario, of course, is one feared by our allies and has the potential to seriously stress the Atlantic security community.

Operational Effectiveness

Nevertheless, the possibility of an attack on U.S. territory in the future by nuclear-armed ICBMs cannot be totally excluded and a defense that could effectively counter this threat would be deserving of serious consideration. The objective of the initial 20 interceptor phase of the proposed NMD system is reportedly

[4] Executive Summary, *Report of the Commission to Assess the Ballistic Missile Threat to the United States*, July 1998.

95-percent effectiveness (at a 95-percent confidence level) against a small scale missile attack.[5] It is unrealistic, however, to believe that the system could achieve anywhere close to this level of effectiveness.

The issue here is not whether it is possible to "hit a bullet with a bullet." The United States certainly possesses the technology needed to build a homing kill vehicle that can hit a high-speed warhead traveling through outer space. Indeed, despite the mixed test-range record for above-the-atmosphere, hit-to-kill intercept tests to date, it is almost certain that the United States could eventually develop and build a system that could do this with a high degree of reliability *on the test range*. However, the real issue is not the test-range performance but the operational effectiveness of the NMD system – how well will it work in the real world, under the stress of battle, with possible unforeseen and unpredictable system shortcomings, and where the attacker will likely take steps ("countermeasures") to defeat the defense.

In particular, a missile defense's record on test range against cooperative targets does not establish how well the system will work. This was well illustrated by the performance of the Patriot anti-missile system in the 1991 Gulf War. Patriot reportedly had a perfect record in tests (17 successes in 17 intercept attempts), but completely failed against the Iraqi Scuds because of an inadvertent Iraqi countermeasure. Unlike the test range targets that flew on smooth, predictable trajectories, the Iraqi Scud missiles broke apart during reentry and as a result began vigorous and uncontrolled maneuvering.

Weaknesses of the NMD system

Quite aside from the problem of countermeasures (see below) there are a number of general factors that indicate that it is implausible that the planned NMD system will be able to provide effective and reliable protection against nuclear-armed ICBMs.

First, the defense is a purely exoatmospheric system. As discussed below, this means it is particularly vulnerable to light-weight, above-the-atmosphere countermeasures.

Second, the proposed NMD system is a single layer system, unlike the regional Safeguard anti-ballistic missile system the United States briefly deployed in the 1970s (or the current system around Moscow) which had two layers, one of which operated above the atmosphere and the other within the atmosphere. It is extremely difficult to achieve high levels of effectiveness with only a single layer of defense.

Third, the hit-to-kill mechanism used by the defense is much more vulnerable to disruption by countermeasures than the U.S. Safeguard or Moscow ABM systems, which used interceptors armed with large nuclear warheads that eliminated the need for pinpoint accuracy.

Fourth, because of the open nature of U.S. society and the long lead time involved in developing and deploying the NMD system, a potential attacker will know the operational characteristics of the U.S. NMD system well in advance. On the other hand, the United States may have little or no information about the countermeasures that potential attackers might be deploying. As a result, the attacker need only devise one effective countermeasure against a known defense design while the U.S. NMD system, if it is to be relied upon, must be able to defeat all of the many plausible countermeasures.

[5] Michael Dornheim, "Missile Defense Design Juggles Complex Factors," *Aviation Week and Space Technology*, February 24, 1997, p. 54.

Fifth, the defense must essentially work the first time it is used. Attacks on U.S. territory using long-range missiles armed with weapons of mass destruction (WMD), if they ever occur, will be very rare events (especially after the United States retaliates for the first one) and are likely to take place over a very short period of time, perhaps 15 minutes. There is only a low probability that a complex missile defense system – with little room for failure – will perform as expected the first time it is fully stressed.

Finally, as discussed below, it is unlikely that the defense will ever be subjected to truly realistic and comprehensive testing. Testing against the full range of possible countermeasures would involve a prohibitively large number of very expensive tests (the first two tests each cost about $100 million). It is also extremely unlikely that the U.S. system would actually ever be tested against a countermeasure that has a real chance of defeating it.

Any decision on whether or not the United States should deploy a national missile defense should take into account how effective the system is likely to be in the real world, not just whether it works against cooperative targets on the test range. Unfortunately, it appears that the "technological feasibility" of the proposed NMD system, to be determined in the July 2000 DRR, will be assessed precisely on the basis of such test-range results against cooperative targets. Worse, it will be based on only three such tests.

The problem of countermeasures

The effectiveness of the proposed U.S. NMD system will be determined primarily by its ability to respond to unexpected circumstances, most importantly steps taken by an attacker to defeat it. Dealing with such offensive countermeasures has been the fundamental problem facing missile defenses from the beginning, and remains so.

NMD supporters argue that third-world countries either will not or cannot develop effective countermeasures. However, effective countermeasures can be built much more easily and at a fraction of the cost of either ICBMs or nuclear weapons.[6] It is unrealistic to imagine that a country that had expended considerable effort in developing nuclear weapons and the ICBMs to deliver them either would not be capable of developing countermeasures or would allow its investment to be nullified when there are relatively straight-forward steps it could take to preserve the effectiveness of these weapons.

This conclusion is consistent with the findings of the 1999 NIE which concluded that emerging missile states would respond to U.S. missile defense deployments, that there was a wide range of countermeasure technologies available to them, and that they could develop countermeasures based on these technologies by the time they flight tested their missiles.[7] The NIE further concluded that both Russia and China have already developed many countermeasures that they may be willing to sell to potential problem states, particularly if they decide it is in their interests to complicate U.S. security calculations.

NMD supporters also argue that advances in sensor and computer technology will enable the defense to defeat countermeasures. However, some countermeasures or combinations of countermeasures appear

[6] George N. Lewis, Theodore A. Postol, and John Pike, "Why National Missile Defense Won't Work," *Scientific American*, August 1999, pp. 37-41, and Andrew M. Sessler (chair), John M. Cornwall, Bob Dietz, Steve Fetter, Sherman Frankel, Richard L. Garwin, Kurt Gottfried, Lisbeth Gronlund, George N. Lewis, Theodore A. Postol, and David C. Wright, *Countermeasures: A Technical Evaluation of the Operational Effectiveness of the Planned US National Missile Defense System*, Cambridge, Mass.: Union of Concerned Scientists and MIT Security Studies Program, April 2000.

[7] National Intelligence Council, U.S. Central Intelligence Agency, *Foreign Missile Development and the Ballistic Missile Threat to the United States Through 2015*, unclassified summary, September 1999.

resistant to the full range of sensors currently planned. For example, many potential countermeasure approaches involve the use of false targets – decoys. These attempt to defeat the defense by overwhelming it with too many potential targets, and rely on the fact that in the vacuum of space both heavy and light objects travel on nearly identical trajectories. Replica decoys would be designed to appear nearly identical to the warhead, but would be much lighter, so that large numbers of them could be deployed along with the warhead.

The effectiveness of many decoy approaches can be enhanced considerably through the use of anti-simulation, which disguises the appearance of the warhead. For example, the warhead could be covered with thin pieces of metal foil (which would burn off on reentry), so as to make it look like a piece of booster debris. Or the appearance of the warhead could be hidden completely by enclosing it in a balloon coated with a thin layer of metal, similar to the mylar balloons sold in florist shops, but larger, and released along with large numbers of similar but empty balloons.

Other countermeasure approaches might seek to prevent the defense's interceptors from hitting the target. For example, the warhead could be placed inside a thin shroud that was then cooled to liquid nitrogen temperatures, effectively make the warhead invisible to the interceptor's kill vehicle. Or the warhead might be placed inside a very large balloon, so that even if the kill vehicle hits the balloon, the odds of it hitting the warhead inside would be small.

Box 2
The Cost of NMD

While it could be argued that no cost would be too great for a truly effective national missile defense, the U.S. NMD system does not and will not meet that exacting performance criterion. The impact on the budget, particularly of a marginally useful system, should therefore be a factor in deciding whether or not to deploy NMD.

Not surprisingly, cost estimates for developing and deploying a national missile defense vary widely, anywhere from roughly $4 billion (for a sea-based defense based on existing Aegis cruisers) to $60 billion (for the proposed two-site ground-based defense). This spread of estimates is unusual even for a defense program and, for a number of reasons, credible figures for the cost of the program are likely to remain elusive.

First, cost itself is a moving target because the design and scope of the system changes according to perceptions of the threat and the overall strength of political support for the program. (In connection with design change and political support, it is worth noting that no administration's missile defense program has ever been implemented unchanged by its successor.)

Second, as is usually the case with major weapons systems, the end cost of developing, deploying and operating the system is likely to be significantly higher (often as much as 50-percent) than estimates made early in the program. This can be attributed to a number of factors, including unforeseen technology challenges, low-balling by contractors, poor program management, etc.

Finally, the cost of key aspects of the program is often excluded from estimates. Missing elements vary, but in the case of the NMD program they often involve NMD-related costs of the two SBIRS satellite systems (some portion of $14 billion), out-year operation and maintenance costs, and developmental costs relevant to the program in previous years. —*JM*

Chapter III

The Ballistic Missile Threat

Joseph Cirincione

It has become common wisdom and certainly common political usage to refer to the growing threat of ballistic missiles. But is this perception true? The threat is certainly changing, and is even increasing by some criteria. This chapter will show, however, that by several other important criteria, the ballistic missile threat to the United States is in fact significantly smaller than it was in the mid-1980s.

The Threat

The perception that the missile threat is increasing is based almost exclusively on the missile program and exports of North Korea. At first glance, this appears an unlikely threat and U.S. officials have had a difficult time convincing allied nations of the seriousness of their concern. North Korea, after all, is a small nation whose population of 21 million is the same as that of Taiwan, but which struggles to produce a $14 billion gross national product that is less that four percent of Taiwan's. The entire North Korean defense budget is an estimated $2 billion per year, or about one-half the annual U.S. budget for missile defense programs alone.

North Korea, however, maintains one million men under arms, is the only nation in the world in an active military confrontation with the United States, and has steadily pursued a program to turn short-range Scud technology into longer range rockets. In the 1990s, North Korea tested and then deployed a 1000-km range missile, the Nodong, based on a scaled-up Scud engine. On August 31, 1998, North Korea tested a Taepodong-1 missile, which is believed to be a Nodong with a Scud-like second stage and a small third stage kick-motor, in a failed attempt to orbit a small satellite. The Taepodong-1 flew only 1320 km, but its international impact was enormous. Last year, Secretary of Defense William Cohen concluded:

> "The Taepodong-1 test was another strong indicator that the United States will, in fact, face a rogue nation missile threat to our homeland against which we will have to defend the American people. Our deployment readiness progr am has had two key criteria that have to be satisfied before we could make a decision to deploy a limited NMD system. There must be a threat to warrant the deployment and our NMD development must have proceeded sufficiently so that we are technologically able to proceed. What we are saying today is that we now expect the first criterion will soon be met, and technological readiness will be the primary remaining criterion."[8]

The 1999 NIE on the ballistic missile threat concluded that over the next 15 years the United States

> "…most likely will face ICBM threats from Russia, China and North Korea, probably from Iran, and possibly from Iraq, although the threats will consist of dramatically fewer weapons than today because of significant reductions we expect in Russian strategic forces." [9]

Specifically, the NIE found that :

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[8] Secretary William Cohen, Press Briefing, January 20, 1999.

[9] National Intelligence Council, "Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015."

> "If it had an *operable* third stage and a reentry vehicle capable of surviving ICBM flight, a converted Taepodong-1 SLV (space launch vehicle) *could* deliver a light payload to the United States. In these cases, about two-thirds of the payload mass would be required for the reentry vehicle structure. The remaining mass is probably too light for an early generation nuclear weapon but could deliver biological or chemical (BW/CW) warfare agent.[10]
>
> "Most analysts believe that North Korea *probably will test* a Taepodong-2 this year, unless delayed for political reasons. A two-stage Taepodong-2 could deliver a several-hundred kilogram payload to Alaska and Hawaii, and a lighter payload to the western half of the United States. A three-stage Taepodong-2 could deliver a several-hundred kilogram payload anywhere in the United States." [Italics in original.]

Iran's 1300-km Shahab-3 missile, tested in 1998, is also believed to be based on the North Korean Nodong and there is concern that, with North Korean and Russian assistance, Iran could develop a longer-range missile similar to the Taepodong-2.

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Box 3.a
Confusion over the nature of the threat

A great deal of confusion exists over the nature of the "threat" facing the U.S. This confusion arises from a conflation in the public debate of the likely *actors*, the type of *weapons* that might be used, and their *means* of delivery. This confusion has led to the assumption that the primary danger to the U.S. is:

- A nation-state with
- a nuclear weapon and
- a long-range missile delivery system.

This is the threat against which NMD is designed.

In reality, however, the threat to the U.S. is probably much greater from:

- Non-state actors (terrorists, state-sponsored or not) with
- non-nuclear weapons, and
- short-range, non-missile delivery systems.

NMD is neither designed for nor capable of protecting the U.S. from state or non-state actors with WMD and "up close and personal" delivery schemes. It is these threats, against which NMD is irrelevant, that pose the most immediate – but still not insurmountable –

Howe… its assess… s by adopti… gical approa… *the United States*, chaired by former Secretary of Defense Donald Rumsfeld. The commission concluded that North Korea, Iran and Iraq could develop ballistic missiles with biological or nuclear warheads that would "inflict major destruction on the United States within about five years of a decision to acquire such a capability…During several of those years, the United States might not be aware that such a decision had been made."[12]

The commission made headlines with its dire warning that these and other nations could deploy an operational ICBM with "little or no warning." The Commission's conclusion implied that:

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[10] On the likelihood of CW/BW attack, see Chapter VI.

[11] Testimony by Robert Walpole before the Senate Governmental Affairs Subcommittee on International Security, Proliferation, and Federal Services, February 9, 2000.

[12] Executive Summary of the *Report of the Commission to Assess the Ballistic Missile Threat to the United States*, July 15, 1998, p. 5.

- an economically and technologically retrograde nation could create sophisticated weapons systems in about the same time as a developed nation;
- the developmental process in such a country will be an almost uninterrupted series of "best case" successes;
- no exogenous events [intelligence leaks, test explosions, economic collapse] will intervene to delay or derail the development program;
- the political relationship between these nations and the West will remain confrontational or worse over the next decade; and
- the U.S will experience an almost uninterrupted series of "worst case" political, military and intelligence failures.

All intelligence estimates before the Rumsfeld report had concluded that it would be 10 to 15 years before any nation other than China or Russia could develop a missile capable of carrying a nuclear warhead to the continental United States, and that we would have ample warning time. An expert panel appointed by the Republican Congressional leadership and chaired by Robert Gates, the former director of the CIA under President George Bush, reaffirmed the soundness of these findings in December 1996, concluding, "the case [for ample warning time] is even stronger than was presented in the estimate."[13]

After the Rumsfeld report and test of the Taepodong-1 missile in 1998, official intelligence estimates shifted to adopt the same questionable methodology used by the Rumsfeld report. Thus, the 1999 NIE concentrated almost exclusively on the possible threat from North Korea, Iran and Iraq and emphasized what "could" happen over the next five to ten years. Conflict within the intelligence community over this shift is evidenced by the inclusion in the NIE of an unusual dissenting opinion from one of the intelligence agencies involved in producing the consensus report:

> "Some analysts believe that the prominence given to missiles countries 'could' develop gives more credence than is warranted to developments that may prove implausible."

Official statements on the threat have compounded the damage by interpreting the "could" possibilities as definitive certainties. Secretary Cohen said this March, "The threat is here today. If it's not here right now it will be here tomorrow."[14]

General Ronald Kadish, director of the BMDO, warned the Senate Armed Services Committee in February, of the possibility that "ballistic missile threats from states that threaten international peace and security will increase as they acquire a capability to launch more and longer range missiles with simple countermeasures in the 2005 to 2010 timeframe." This view by the Clinton Administration of the North Korean missile program is the major factor justifying a crash effort to deploy a missile defense system by 2005.

However, a very different – and more accurate – threat assessment emerges if, rather than focusing only on the possible threat from three nations, a net assessment is performed of developments in global ballistic missile arsenals over the past 15 years. It then becomes clear that the ballistic missile threat is confined, limited and changing relatively slowly.

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[13] Robert Gates, Chairman, Independent Panel Review of *Emerging Missile Threats to North America During the Next 15 Years*, December 1996.
[14] Secretary William Cohen, Press Briefing, March 24, 2000

A Net Assessment of the Global Ballistic Missile Threat

A close analysis of the global ballistic missile threat reveals several important trends.

ICBM Arsenals

The number of intercontinental ballistic missiles (with ranges over 5,500-km) has decreased dramatically since the height of the Cold War. During the 1980s, the Soviet Union deployed over 9,540 nuclear warheads on 2,318 long-range missiles aimed at the United States.[15] Currently, Russia has fewer than 5,200 missile warheads deployed on approximately 1,100 missiles.[16] This represents a 52-percent decrease in the number of missiles capable of striking the territory of the United States and a 45-percent decrease in the number of nuclear warheads on these missiles.

These decreases will certainly continue over the next ten years. With or without the implementation of the START II and III strategic arms reduction treaties, Russia is expected to field fewer than 2,000 nuclear warheads on missiles and bombers by 2010—perhaps no more than several hundred, depending on political and economic factors. Two thousand warheads would represent an 80-percent decrease from the mid-1980s; 500 warheads would be a 94-percent decrease.

During this period, China has maintained a force of some 20 DF-5 intercontinental ballistic missiles. National intelligence estimates predict that this force will remain roughly the same size over the next ten years, although military and political developments could result in significant increases.

Intermediate-range Missiles

The number of deployed intermediate-range ballistic missiles (IRBMs with ranges of 3,000- to 5,500-km) has also decreased dramatically over the same period. President Ronald Reagan negotiated and implemented the Intermediate-Range Nuclear Forces (INF) Treaty, eliminating this entire class of missiles from U.S. and Soviet arsenals. The Soviet Union destroyed 1,846 missiles in this range and the United States destroyed 846 ballistic and cruise missiles. China has some 20 DF-4 missiles in this range, with the first deployed in 1981. No other nation has developed IRBMs, though the launch of a two-stage Taepodong-2 would add a few missiles to this category. There has thus been close to a 100-percent decrease (98.9-percent) in the threat from IRBMs from the mid-1980s to 2000.

Medium-range Ballistic Missile Programs

Apart from China and Russia, a few countries have conducted tests of medium-range ballistic missiles (with ranges of 1,000 to 3,000-km). India intends to begin production of the Agni-II, with a range of about 2,000-km and may be working on longer-range Surya missile of up to 3,500-km range. The only other significant medium-range threats come from missiles derived from the North Korean No Dong, Pakistan's Ghauri (1,300-km range) and Ghauri-II (2,000-km range) missiles and Iran's Shahab-3 (also 1,300-km range), all of which have been flight tested. There are some speculative reports that Pakistan is working on a Shaheen-II missile of 2,400-km range and Pakistan has tested engines for a Ghauri-III, which

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[15] Robert Norris and Thomas Cochran, *Nuclear Weapons Databook, U.S.-U.S.SR/Russian Strategic Offensive Nuclear Forces, 1945-1996,* Natural Resources Defense Council, January 1997, pp. 13 and 46.

[16] The latest Memorandum of Understanding between the United States and states of the former Soviet Union (July 1999) counts 6,390 warheads on ICBMs and SLBMs. Over a thousand of these warheads, while officially counted for the purposes of the START Treaty, are not operationally deployed.

Pakistani officials claim would have a range of 2,700-3,000-km. Saudi Arabia is believed to have a number of DF-3 missiles (2,600-km range) purchased from China before that nation agreed to abide by Missile Technology Control Regime (MTCR) restrictions. None of these missiles threaten U.S. territory.

Missile Development Programs

The number of countries trying or threatening to develop long-range ballistic missile has not changed greatly in 15 years, and by some indications may be considered smaller than in the past. The nations now attempting to perfect long-range missiles are also smaller, poorer and less technologically advanced than were the nations with missile programs 15 years ago.

We now worry primarily about five nations, in addition to Russia and China: North Korea, Iran, Iraq, India and Pakistan. Fifteen years ago, North Korea was not a concern, but India, Brazil, Argentina, Egypt, South Africa and perhaps Libya were all involved in programs to develop long-range missiles. All but India have since terminated such efforts. Israel retains the capability to develop long-range missiles, but is not considered a threat to the United States nor a likely exporter of missile technology.

[redacted]

	Agni-2	T	2,000	1,000	I/United States/France
	Surya	D?	3250+?	?	I
Iran	Shahab-3	T	1,300	750	I/DPRK
	Shahab-4	D	2,000	?	I/Russia
	Shahab-5	D?	3,000-5,500?	?	I/Russia
Israel	Jericho-2	O	1,500	1,000	France/I

	Jericho-3	D	2,500	1,000?	I
North Korea	Nodong-1	D/T	1,000	700-1,000	I
	Nodong-2	D	1,500	770	I
	Taepodong-1	T	1,500-2,000	1,000	I
	Taepodong-2	D	3,500-5,500	1,000	I
Pakistan	Ghauri	T	1,300	500-750	I/DPRK
	Ghauri-2	D/T	2,000	1,000	I/DPRK
	Shaheen-2	D?	2,500	?	I/DPRK?
	Ghauri-3	D/T	2,700-3,500	?	I/DPRK
Saudi Arabia	Dong Feng-3 (CSS-2)	O	2,600	2,150	PRC

KEY: This table list those nations, other than the five declared nuclear-weapon-states, that have missiles with ranges exceeding 1,000 km.
D = Developmental T = Tested O = Operational I = Indigenous

Aging Scuds

Almost all of the nations that possess ballistic missiles have only short-range missiles. Specifically, apart from the five recognized nuclear-weapon states, there are 33 nations with ballistic missiles, but the vast majority (27 nations) have only short-range missiles under 1,000-km. Furthermore, 22 of the 33 nations have only Scuds, which are declining in military utility over time, or similar missiles of 300-km range or less. (Iraq officially has only short-range Scuds but may have assemblies for extended-range Scuds hidden in the country).

Only six nations – Israel, Saudi Arabia, India, Pakistan, North Korea and Iran – have medium-range missiles over a 1000-km range. Only four of these nations – India, Pakistan, North Korea and Iran – have active programs for developing intermediate-range missiles of over 3,000-km in the next 10 years.[17]

The blurring of short- and intercontinental-ranges for the world's missile inventory results in the misinterpretation of the oft-quoted assessment that over 25 nations possess ballistic missiles. This is true, but only China and Russia are potential adversaries with the capability to hit the United States with nuclear warheads on intercontinental ballistic missiles. This has not changed since Russia and China deployed their first ICBMs in 1959 and 1981 respectively. This confusion is perpetuated when policy-makers speak of threats from missiles to the United States or U.S. interests, such as forward-deployed troops or allied nations. This again merges threats from very short-range missiles, of which there are many, with long-range missiles, of which there are few.

The more accurate way to summarize existing global ballistic missile capabilities is that there is a wide-spread capability to launch short-range missiles (mostly Scuds). There is a slowly growing, but still

[17] For a complete table of countries possessing ballistic missiles, see the Carnegie Non-Proliferation Project web site at: <http://www.ceip.org/programs/npp/bmchart.htm>.

limited, capability to launch medium-range missiles. Most importantly, there is a decreasing number of long-range missiles that can threaten the United States.

Conclusion

Some might argue that the diplomatic developments in North Korea made the 1999 NIE obsolete two weeks after it was publicly released. On September 17, 1999, the Clinton Administration announced it would ease sanctions against North Korea in response to a pledge by Pyongyang to halt further testing of long-range missiles. If North Korea does not flight-test the Taepodong-2, and if that nation can be further convinced not to export missiles or related technology, the greatest source of an additional ICBM threat to the United States would be eliminated.

Unclassified photos of the North Korean test facilities released earlier this year revealed what many analysts have long concluded: the missile program is primitive by world standards, not capable of sustaining multiple launches of missiles, and of limited military utility. North Korea, increasingly eager to open normal trade relations with the West, seems to be willing to suspend a dubious program for real material gain (see Chapter VI).

Both the 1999 NIE and the Rumsfeld Commission assume an optimistic and fairly straightforward path for North Korea to scale up their existing missiles to true intercontinental range. But only the United States, Russia and China have been able to build a missile of this range thus far. One cannot completely rule out the possibility that North Korea could develop a missile with enough range to reach the continental United States within ten years. However, the obstacles are formidable. As previous intelligence estimates have reported, the Taepodong-2, 3 or 4, would have to make remarkable progress in propulsion, guidance and reentry vehicle technology. Moreover, as the size of the missile increases, it requires a difficult manufacturing and engineering shift from the steel bodies employed by Scuds to low-weight, high-strength alloys. Finally, North Korea would have to manufacture a nuclear warhead small enough and sturdy enough to fit on the tip of the missile. There is no evidence that North Korea has mastered these techniques, only speculation that it might be possible.

Recent talks between the United States and North Korea indicate some possible progress towards the goal of eliminating the North Korean missile threat. In his October 1999 report, "Review of United States Policy Toward North Korea," former Secretary of Defense William Perry recommended that the United States, together with South Korea and Japan, seek "complete and verifiable" assurances that North Korea had ended its nuclear weapons program and ceased the testing, production, deployment and export of medium and longer-range missiles. The April announcement of an historic summit between the leaders of North and South Korea could herald the biggest diplomatic breakthrough yet in a half century of conflict and tension on the peninsula. Japanese Foreign Minister Yohei Kono believes the meeting could have "epoch-making significance" leading to further progress and an easing of tensions.

If North Korea were taken out of the equation there would be very little left to the current ballistic missile threat estimate. Admiral Dennis Blair, the commander-in-chief of U.S. Pacific forces, recently said that if there were a verifiable agreement ending the North Korean missile program it would have "a very big effect" on the timetables for deploying both theater and national missile defenses. While North Korea "is not the only place that the U.S. forces face theater missiles," he said, without a North Korean threat, missiles " would not be the main part of the Northeast Asian problem." And "on a national missile defense…the North Korean development and the Taepodong launch is clearly one of the key, if not the key factor, in determining the parameters and the deployment schedule and the capabilities of that system." A negotiated resolution to that threat " would make a big difference."[18]

Under some other plausible scenarios, by the time the proposed NMD system reaches full operational capability in 2007-2010, North Korea might have collapsed; democratizing trends in Iran could have altered the direction of that nation's program; or a post-Saddam Iraq could have restored friendly relations with the West. The international political, diplomatic and legal environment is highly relevant to the prospects for global development of ballistic missiles. These factors should be included in any "could" assessments of the threat.

In sum, the threat from nations with emerging medium-range ballistic missile programs to interventionary forces or neighboring countries should not be taken lightly. Although neither North Korea, Iran, or Iraq is thought to have a nuclear warhead for these missiles, it is possible that over time these missiles could add to the threats U.S. troops abroad and U.S. allies must confront. This medium-range challenge should not be confused, however, with an immediate threat to the territory of the United States. That threat is actually diminishing but is nonetheless being used to justify a decision to rush into production an untested weapons system that will have significant strategic, stability and security implications and that could exacerbate the very threat it hopes to defend against (see Chapter V).

Figure 3.b – The Decreasing Global Ballistic Missile Threat

Threat	**Status (1985 vs. 2000)**	**Trends**
ICBM (>5500-km)	52-percent decrease	↓
IRBM (3000-5500-km)	99-percent decrease	↓
MRBM (1000-3000-km)	3 new national programs	↑

[18] See the address of Admiral Dennis Blair to the Carnegie International Non-Proliferation Conference, March 16, 2000, available at: <**Error! Bookmark not defined.**.ceip.org/programs/npp/blair2000.h tm>.

SRBM (<1000-km)	Static but declining as Scud inventories age.	↓
Number of nations with ballistic missile programs of concern	Fewer, less advanced (8 in mid-1980s, 7 today)	↓
Potentially hostile nations with ballistic missile programs	More (3 in mid-1980s, 5 today)	↑
Potential damage to the U.S from a missile attack	Vastly decreased.	↓

Chapter IV

The Impact of NMD on the ABM Treaty

Jack Mendelsohn

The Clinton Administration is currently seeking Russian agreement to amend the ABM Treaty to permit deployment of an NMD system that would otherwise be in violation of the Treaty. The implication of the U.S. government's position is that only a few, relatively minor adjustments to the Treaty – primarily to the numbers and location of ABM interceptors and radars – would be required and the ABM Treaty would still retain its role as "the cornerstone of strategic stability."

This chapter will show that, in fact, the proposed U.S. NMD program (not to mention the "other promising missile defense technologies" supported by Senator Lott – see Box 5.a) and the amendments required to permit its deployment would contravene the overall objective as well as just about every substantive element of the Treaty, rendering it a meaningless document.

Why do we have the ABM Treaty?

For the past fifty years the United States and Russia have used the threat of devastating retaliation with nuclear weapons – that is, deterrence – to manage the challenge to national security posed by potential adversaries. While living under deterrence has never been comfortable, over time – and after a serious crisis in 1962 – the major adversaries, as well as China, France and the U.K., have developed an imperfect but acceptably stable strategic relationship.

The basis for this stable strategic relationship has been the ability of nuclear-armed adversaries to maintain confidence in *a secure and survivable retaliatory capability*. During the 1960's, the United States (and later the Soviet Union) came to recognize that large numbers of highly capable BMD systems could undercut confidence in the ability to deter. Loss of confidence in retaliatory capability would, in turn, interfere with efforts to shrink offensive arsenals or, more disturbingly, provoke additional, compensating deployments of offensive weapons. (In fact, the initial U.S. response to the Soviet ABM program was to develop multiple independently-targetable warheads (MIRVs) for U.S. missiles.)

To forestall this inevitable interaction between opposing offensive arsenals and defensive interceptor forces, the United States and the Soviet Union agreed to severely limit strategic (or national) missile defenses in the 1972 ABM Treaty.[19] It is because of the ABM Treaty and the absence of any effective ballistic missile defenses that SALT I and SALT II and then the substantial force reductions agreed to in START I and II and projected for START III were negotiable. These strategic arms reduction agreements are scheduled to bring down the number of nuclear warheads aimed at the United States from over 10,000 to 2500 or less.[20]

The Objective of the ABM Treaty

Both the United States and Russia continue to describe the ABM Treaty as "the cornerstone of strategic stability." It is the cornerstone because the fundamental *objective* of the Treaty was to prohibit the United States and the Soviet Union (now Russia) from deploying ABM systems for a defense of their

[19] The text of the ABM Treaty may be found on-line at <**Error! Bookmark not defined.**>.

[20] The Russians have suggested a START III level of 1500 warheads.

territory and from providing a base for such a defense (Article I). This constraint on the deployment of defensive systems was intended to "stabilize" the competition in offensive arms and pave the way for eventual reductions.
As the preamble to the ABM Treaty notes, the United States and the Soviet Union believed that limiting ABM systems "would be a substantial factor in curbing the arms race in strategic offensive arms." Moreover, they hoped that such limits "would contribute to the creation of more favorable conditions for further negotiations on limiting strategic arms."

What the Treaty does
To restrict the establishment of a defense of national territory or a base for such a defense, the Treaty places four types of limits on ABM deployments: geographical; numerical; technological; and operational.

Geographically, the 1972 Treaty originally limited ABM interceptor deployment to two sites (Article III). One of these sites could be an ICBM field and the other the national capital, but the two had to be at least 1300-km apart to avoid overlapping coverage that could form the beginning of a potential nationwide defense.[21] In 1974, the Treaty was amended by a protocol to permit ABM deployments at only one site, either an ICBM field (the U.S. choice) or the national capital (the Soviet option).

In addition to the location of the interceptor fields, there were geographic constraints on the deployment of ABM early warning and engagement radars. For example, future early-warning radars must be located "along the periphery of the country and oriented outwards" (Article VI). U.S. early warning radars located overseas in the U.K. and Greenland were "grandfathered" (permitted to remain operational because they were in place prior to signature of the Treaty), but the extent to which these radars undergo technological upgrade has been in dispute. There are no explicit limits on space-based sensors for early warning.

Finally, all ABM engagement radars (which can track incoming warheads, discriminate decoys and guide interceptors) must be located within a circle with a 150-km radius at the two interceptor deployment sites (Article III).

Numerically, the 1972 Treaty originally limited ABM interceptors and their launchers to 100 at each of two sites (Article III). As noted above, the two-site provision was amended by a Protocol in 1974 and now only 100 interceptors at one site are permitted. ABM engagement radars were limited to six "complexes" at the national capital site and to 20 radars at the ICBM field (Article III).

Technologically, the limits in the Treaty attempt to deal with the problem of system "upgrade" and "futuristic" weapons. The Treaty prohibits giving missiles, launchers or radars, "other than ABM missiles, launchers or radars," capabilities to counter strategic ballistic missiles or warheads in flight (Article VI). This means, for example, that air defense (SAM) or TMD systems – like Patriot and THAAD – should not be made capable of intercepting strategic, long-range missiles or be tested "in an ABM mode" (that is, against strategic, long-range missiles).

The issue of constraining the potential capabilities of TMD systems has, of course, been a matter of contention between the United States and Russia over the past decade. In an as yet unratified 1997 "demarcation" protocol, the two sides agreed that as long as TMD systems were tested only against

[21] Agreed Statement C.

targets traveling no faster than 5-km/sec and to ranges no longer than 3500-km – a slower speed and shorter range than that of most modern strategic ballistic missiles – they would not be considered ABM systems. However, by applying the constraints to the target and not the interceptor (whose inherent capabilities could remain untested), this 1997 TMD demarcation agreement sidesteps the ABM Treaty's injunction against giving strategic intercept capabilities to non-ABM systems.

The ABM Treaty also makes the deployment in the future of fixed land-based ABM systems based on other physical principles (e.g., lasers, particle beams, x-rays, etc.) subject to discussion, agreement and treaty amendment.[22] The Treaty does not permit the development, testing or deployment of future technologies on other than fixed land-based systems (Article V).

Operationally, the ABM Treaty permits the deployment only of fixed land-based ABM components (launchers, interceptors and radars) and bans all mobile ABM systems. This ban on mobile systems includes the development, testing, and deployment of all ABM components that are "sea-based, air-based, space-based, or mobile land-based" (Article V).

Finally, to avoid circumvention of the Treaty through third parties, the Treaty also prohibits the deployment or transfer of ABM components (launchers, interceptors or radars) to other states (Article IX).

The Impact of NMD on the ABM Treaty

The proposed U.S. NMD system is intended to provide a defense of the entire continental United States, Alaska and Hawaii against a small scale (5 to 50 warheads) attack (see Chapter I). The NMD system has four basic components:

- 20 to 100/125 interceptors at each of two sites, initially Alaska and then North Dakota;
- a suite of X-band ABM engagement radars in the United States and abroad;
- UEWRs in the United States and abroad at grandfathered locations, as well as possibly at a new site in South Korea; and
- Two space-based infrared sensor systems in high-earth orbit (SBIRS-High) for early warning and low-earth orbit (SBIRS-Low) for mid-course tracking, decoy discrimination and guidance.

The intent of the proposed U.S. NMD program is both to provide a nationwide defense from the initial one or two sites and to establish a base for the expansion of such a defense if the future threat requires it. The NMD base would result from upgrading or deploying a comprehensive suite of early warning and engagement sensors in the United States, abroad and in space which could provide tracking data to an expanded interceptor force. Because it would cover the entire country, and because it would provide a base for future expansion, the U.S. NMD system as currently envisaged would be a violation of the basic and fundamental *objective* of the ABM Treaty (Article I).

Geographically, the proposed U.S. NMD program would violate the ABM Treaty, as amended by the 1974 protocol, if interceptors were deployed at more than one site or at a single site that was not an ICBM missile field or the national capital area (Article III).

In addition, placing ABM X-band engagement radars outside the 150-km-radius. circle surrounding the permitted ABM site(s) (i.e., the radar on Shemya Island and the interceptors in central Alaska) would be

[22] Agreed Statement D.

in violation of the ABM Treaty. Locating X-band engagement radars in the U.K., Greenland and South Korea and an early warning radar in South Korea would be another violation of the existing Treaty (Articles III and IX).

Numerically, the proposed U.S. NMD program would violate the ABM Treaty as amended if more than 100 interceptors were deployed at more than one site (Article III and 1974 Protocol).

[redacted]

has early warning radars in Ukraine, Belarus and Azerbaijan and an ABM test range in Kazakhstan.

Conclusion

The U.S. NMD program, as currently designed, is directly contrary to the ABM Treaty's fundamental objective, would violate virtually every one of its limiting provisions and would render its basic restrictions a dead letter. Administration claims notwithstanding, it is not possible to "amend" the ABM Treaty to permit deployment of all phases of the present U.S. ground-based and space-based NMD program without gutting the agreement. This is also true for the "other promising missile defense technologies," mentioned by Senator Lott in his April 17 2000 letter to President Clinton (see Box 5.a). Proposals for a multi-layered NMD based on land, sea, air and space-components would be completely inconsistent with any kind of agreed constraints.[23]

[23] The United States is currently seeking to amend the ABM Treaty to permit deployment of only the first phase of the NMD program: an interceptor site in central Alaska and an X-band radar on Shemya Island. This negotiating position presents a dilemma to both Russia and the U.S. Senate. The former fears that agreeing to the first phase *opens* the door to more extensive deployments. The latter fears it *closes* the door (see Box 5.a).

Moreover, it is not the numerical constraints on interceptors that are the primary concern of Russia. The ABM Treaty did, after all, originally permit 200 interceptors and under START III Russian strategic nuclear forces will remain adequate enough to overwhelm any U.S. NMD system with 250 interceptors.

What Russian officials are most concerned about is the creation by the United States of an NMD infrastructure of upgraded or newly deployed ground-based radars and space-based sensors. This effectively hemispheric sensor system would, in Russian eyes, provide the United States with a "base" for a territorial defense from which it could "breakout" and deploy hundreds of ABM interceptors and link up with (and upgrade the performance of) hundreds of highly capable TMD systems. Russians are also concerned, for good reason, that agreement to the early phases of the current U.S. NMD program will put them on the slippery slope toward deployment a much more robust, "layered" U.S. missile defense system which could put them at a perceived strategic disadvantage (see Chapter V)

Finally, given the nature of deterrence and the offensive/defensive dynamic, it is not Russia alone – or even primarily – that will react most strongly to the demise of the ABM Treaty and U.S. NMD deployments which are to be spread out over the next decade (see Chapters I and V). If it wishes to continue to be able to deter the United States, China cannot allow its retaliatory capabilities – currently estimated to be approximately 20 warheads – to be neutralized by a U.S. NMD system. Thus, even a U.S. NMD program intended to counter a threat of 20 to 50 (presently non-existent) North Korean warheads is likely to provoke a Chinese deployment of several hundred or more long-range, strategic warheads. If the Chinese do, indeed, expand their strategic nuclear forces to overcome a U.S. NMD deployment, then the U.S. NMD program, whose ostensible purpose is to protect the nation from the threat of nuclear attack, will have resulted in a net decrease in U.S. security.

Chapter V

The Strategic Impact of NMD

John Steinbruner

At first glance it would seem that the NMD system being contemplated by the United States promises to be exceptionally expensive and basically ineffective, but not necessarily provocative. As is widely understood, the envisaged system can be penetrated and defeated by any country capable of mastering the core technologies of ballistic missiles (see Chapter II). It can also be bypassed by utilizing the more readily available technology of cruise missiles. If the United States insists on deploying an NMD system for emotional or political reasons, it would seem then that other countries might be bemused, but they would not have grounds for serious objection. As a corollary, the vehement objections that are in fact being advanced by Russia and China might then be their own form of emotional indulgence which could in the end be bargained away or safely ignored.

Unfortunately, the actual situation is not so benign. To potential strategic opponents, the ineffectiveness of the advertised American system is more ominous than reassuring. It suggests deviousness. No nation that might find itself in confrontation with the United States can afford to assume that the United States will adhere indefinitely to NMD limitations that virtually preclude any meaningful capability. Nor can it totally discount the impact over time of even a limited defensive system deployed by the most technologically sophisticated nation in the world.[24] Even though the U.S. NMD system will, in reality, be quite permeable, strategic planners in both Moscow and Beijing will have to attribute "best case" capabilities and "worst case" outcomes to any analysis of the strategic interaction between their offensive systems and U.S. defenses. In short, the effectiveness (or ineffectiveness) of the NMD system is largely irrelevant to its strategic impact.

The real purpose of the announced system, adversaries are driven to conclude, is to begin the process of overturning the legal prohibition on national missile defense deployment established by the 1972 ABM Treaty (see Chapter IV). Once that has been accomplished and the basic infrastructure of sensors and data handling is in place, then a more serious defensive system could be created by adding more launchers of more robust design and linking to widely disbursed and highly capable TMD systems unconstrained by the ABM Treaty. The plans for this more robust defense were outlined in a recent letter from Senator Trent Lott and twenty-four other U.S. Senators to President Clinton criticizing the administration's efforts to seek only limited amendments to the ABM Treaty (see Box 5.a).

Furthermore, under the aspirations of U.S. Space Command (USSPACECOM), the continuous monitoring capabilities associated with missile defense would be integrated into an effort of much broader scope that is unabashedly offensive in character. USSPACECOM says it is developing the capacity to track all major military activities, to attack them rapidly and precisely at any time, and to deny corresponding capabilities to anyone else. Given the large financial and technical advantages that the U.S. military establishment currently enjoys, no one can easily dismiss that vision, flamboyant as it might seem. If achieved, it would bring the already imposing offensive capabilities of the United States to the point of decisive superiority.

[24] Center for Security Policy *Decision Brief No. 00-D 35*, April 12, 2000, which cites Gen. Ronald Kadish, Director of BMDO, as arguing for a "layered," i.e., sea- and space-based, anti-missile system.

Plausible Reactions

As the principal countries that consider themselves to be potential strategic opponents of the United States, Russia and China carry the main burden of this situation.[25] Both maintain strategic nuclear deterrent forces based primarily on ballistic missiles directed against the United States. Both do so with substantial difficulty and at substantial disadvantage. Russia inherited a large force from the Soviet Union with thousands of weapons nominally available but does not have the current financial assets or the longer term economic base necessary to sustain that force. China has all along relied on a much small force of some 20 missile launchers not maintained on immediate alert status (see Box 6.b). When it comes to daily operating conditions, both of these forces are in principle quite vulnerable to an attack initiated by the larger and technically more capable U.S. nuclear forces. They both have substantial conventional force disadvantages vis-à-vis the United States as well and these are likely to increase under current rates of defense investment.

[redacted]

Faced with existing force asymmetries that do not afford the same confidence in its strategic capabilities as Russia, and facing the possibility of confrontation over Taiwan at any time, China has immediate reason to react more assertively. Moreover, with no bilateral treaties to turn to, China needs to devise some other form of leverage. It would be natural for Russia to adopt an apparently accommodating stance and China a confrontational one, perhaps with some degree of coordination.

[25] Parts of the following discussion have been derived from John Steinbruner, "National Missile Defense: Collision in Progress," *Arms Control Today*, Vol. 29, no. 7, November 1999.

[26] In connection with the Duma's long-awaited ratification of the START II Treaty, Vladimir Putin, the Russian President, made the following statement: "I want to stress that in this case we have a possibility and will withdraw not only from the START II Treaty but also from the entire system of treaty relations on the limitation and control over strategic and conventional armaments. We will be able to also raise the question of a revision of our decisions in the field of tactical armaments." Federal News Service, April 14, 2000.

Russia, at any rate, does not have to invent the most significant countervailing leverage it brings to bear. That emerges naturally from its internal situation. Russia has an economic base that is currently assessed at less than 2-percent of the United States alone and is plagued with deep structural problems closely related to the Soviet Union's ultimately unsuccessful effort to keep pace with Western military development. As a result, the Russian government does not have adequate financial assets to perform any of its major functions, including support of its 1.2 million person military establishment. That establishment has been financially starved under the Russian Federation and has been progressively deteriorating for a decade. It is nonetheless responsible for what is inherently the most demanding security mission in the world – defense of the 17,000 km perimeter of Russia with NATO to the West and China to the East. None of the central missions can be performed to the standards of traditional contingency planning. No international security arrangement provides direct assistance of meaningful consequence.

Faced with an overall security burden that is essentially unmanageable, Russia has turned to comprehensive reliance on the deterrent effect of nuclear weapons to cover virtually all major security missions. This means, at a minimum, that Russia will be reluctant to impose meaningful limits on tactical nuclear arsenals and will do its utmost to keep its strategic and tactical nuclear forces at levels sufficient to deter the United States and China.

But even a heightened role for nuclear deterrence is not an assured redoubt for Russia. The nuclear weapons component of the Russian military establishment is not immune to the general process of deterioration, and at any rate it is destined for financial reasons to be substantially smaller and less capable than the U.S. force is currently projected to be. That combination of circumstances will predictably intensify Russian reliance on rapid reaction procedures (launch-on-warning) to protect its residual force against preemptive destruction and will also degrade the capacity to manage those operations safely. Even a limited U.S. NMD deployment that the Russians agreed to accept would reinforce that perverse effect and virtually assure that NMD does far more harm than good both in terms of its impact on operational procedures and on the overall strategic relationship.

Moreover, however great or small the perverse incentives created by a limited NMD deployment might prove to be, they are significantly compounded by a sense of political betrayal. As the Russians read recent history, the Soviet government that allowed German unification to occur in a swift and graceful manner believed it had been assured at the time that NATO would not extend its jurisdiction eastward in the wake of that event. Nonetheless NATO quickly proceeded to do so and currently talks as if it will continue the project.

Box 5.b
European Allies

The NATO allies are acutely sensitive to the impact NMD might have on the stability of the international strategic environment. The Germans are concerned the NMD might "decouple" the United States from the Alliance. As Foreign Minister Fischer said last year, missile defenses could lead "to split security standards within the Alliance," a situation wherein one ally is safer than the rest. This differentiated security could have two outcomes: the United States could disengage internationally and/or become more inclined to intervene unilaterally and preemptively. In either or both cases, Europeans could be at greater risk.

The French have emphasized the strategic and arms control impact of NMD. Prime Minister Jospin noted last year his concern that NMD could threaten "the global strategic equilibrium" and undermine efforts to constrain nuclear and ballistic missile proliferation. French Ambassador Gerard Errera, Political Director of the Foreign Ministry, suggested that if the United States is prepared to abrogate the ABM Treaty to deploy NMD, then it too must be prepared to deal with the reality that other countries could decide to abandon multilateral arms control regimes such as the NPT. He asked how, "by pursuing NMD…do you avoid giving the impression that you have given up on the fight against proliferation."

The United Kingdom, while "sympathetic" to U.S. concerns about the threat, expects answers to certain questions. These include:

- The impact of NMD on NATO cohesion – i.e. could it erode the common response to a credible reassurance to Russia, particularly with regard to the ultimate configuration of any NMD which might be permitted by Russian acquiescence to an initial U.S. deployment (see Box 5.a).

There is a comparable problem with China as well. It is not as immediately urgent in operational terms. The interaction of United States and Chinese deterrent forces is not as active or as potentially volatile as is the case with Russia. There is also less reason to worry about deterioration within the more modestly configured Chinese military establishment. Nonetheless, it is fair to assume that China will attempt to retain a deterrent capability in the wake of a U.S. decision to deploy NMD. To do so, it will have to decide soon whether to devote more resources to upgrading its strategic forces, accelerating and perhaps augmenting its on-going modernization program, and paying more attention to the development of counter-measures (see Chapter II).

In political terms, however, the problem is at least as acute and the projected consequences yet more ominous. China is reading the entire NMD effort being conducted by the United States in the context of the USSPACECOM program and is raising grave objections with major implications. Although buffered so far with diplomatic decorum, the core of the indictment and the nature of the reaction are both quite apparent. China considers the integrated missile defense and space programs to be inherently offensive in character and extremely dangerous. If the United States persists in its efforts, China apparently does not intend to match the U.S. NMD program and would prefer not to have to counteract it with an augmented deterrent effort. It would rather prevent NMD deployment by vigorously contesting the initial stages of the program.

China has made it quite clear that it will be uncooperative in all multi- and bilateral arms control fora if the United States proceeds with NMD. Moreover, it has pointedly noted that the full array of commercial and military support activities in space do not rest on an explicitly established legal foundation and has pointedly warned that these heretofore accepted activities would be highly objectionable in the context of the projected U.S. NMD program.[27] The implicit threat is first to contest the legality of space overflight and then to interfere with transiting satellites if the warning is not heeded.[28] If pursued very far, that reaction would bring virtually all space activities into question and would force those undertaking commercial investment and military and monitoring support functions to ponder their balance of interests. That would produce a major political crisis, but for exactly that reason it could change the politics of missile defense deployment quite dramatically.

At the moment, a wrenching collision of policy seems unavoidable. The United States might well postpone the NMD deployment decision now scheduled for October 2000 but will presumably not abandon the program or reverse the now legislated intent. Russia may temporize to protect the ABM Treaty but presumably will not endorse the principle of a national missile defense deployment. China presumably is not bluffing. In the end, the United States cannot simply plow through the Russian objections and ignore the Chinese reaction. The attempt to do so would eventually awaken the many constituencies involved in space activity and the security arena and the highly divisive consequences might shatter an otherwise dominant U.S. alliance system. Well before the end is reached, however, some serious damage is likely to be done – if it has not already been done – to the entire framework of legal restraint on nuclear weapons and the transparency measures which accompany those restraints. If this international framework is

[27] See, for example, the Statement by Mr. Hu Xiaodi, Ambassador for Disarmament Affairs of China, at the Plenary of the Conference of Disarmament, Geneva, Switzerland, February 24, 2000.

[28] Article XII of the 1972 ABM Treaty accepted the practice of U.S. and Soviet/Russian satellite overflights. In it "Each Party undertakes not to interfere with the national technical means of verification of the other Party…"

compromised, NMD will have brought about a dramatic decrease in security for the United States and the rest of the world.

A Constructive Conclusion

Nonetheless, constructive thoughts are still in order. When the unpleasant implications of the NMD effort begin to be visible and romantic images of protecting the United States from every imaginable threat are stripped away, there will be a need to explore a more accommodating and more responsible outcome.

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Chapter VI

Alternatives to NMD

Steve Fetter & Jack Mendelsohn

Previous chapters have made two broad points: that the currently envisioned NMD system would encounter serious technical, political and strategic problems defending against actors armed with long-range ballistic missile systems; and that NMD would be irrelevant against actors with short-range ballistic or cruise missiles or against those employing non-missile delivery systems.

This chapter lays out an alternative approach to protecting the United States from both the threat of long-range missile attack and the broader spectrum of potential threats to security from identifiable and non-identifiable actors.

Alternatives to NMD

This alternative approach is based on preserving and strengthening the existing web of military, political, economic and legal measures designed to prohibit, impede, isolate, expose and respond to the activities of potentially hostile state and non-state actors. While none of the individual elements of this alternative approach constitutes in itself a definitive response to all potential challenges, their interaction creates a significant barrier to a multi-faceted threat. Most importantly, compared to NMD, this alternative approach would be less destabilizing, less costly, and no less permeable.

Deterrence

The value of deterrence in heading off threats to U.S. security should not be underestimated. Despite its critics, and predictions about its imminent demise, there is no indication that deterrence (the threat of devastating retaliation) has lost its role as a primary factor in restraining identifiable adversaries from WMD use. As a matter of fact, all the evidence of the nuclear age indicates just the contrary.

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- Which nations are declared nuclear powers (five – China, France, the U.K., the U.S., and Russia),
- Which are free of the Treaty's constraints (four – Cuba, India, Israel and Pakistan), and
- That, with the exception of three or four "backsliders," the balance of the world's nations are not seeking nuclear weapons.

Secondly, negotiated arms control agreements can actually *eliminate* major portions of the threat. The 1987 INF Treaty between the United States and the Soviet Union eliminated an entire class of weapons that threatened our allies and forces in Europe. When fully implemented, the chemical weapons convention (CWC) will eliminate all chemical weapons and stockpiles.

Treaties establishing nuclear-weapons free zones (NWFZ) in most of the land area of the Southern Hemisphere have also helped to eliminate threats. These NWFZ treaties reassure the roughly 110 states-parties to those agreements that their neighbors are not, and do not intend to become, nuclear weapons possessor or basing states. It was against the background of a NWFZ in Latin America that Brazil and Argentina agreed to negotiate among themselves an end to their (unacknowledged) nuclear weapons programs and, in the process, enhance their own security as well as that of the region.

Third, negotiated arms control agreements *impede* the development or spread of the threat. There may well be states which seek to circumvent the restrictions of an agreement, but a universal ban on the proliferation of certain arms, such as nuclear, chemical or biological weapons, enormously complicates the pursuit of these systems by potential violators. For example, Iraq's nuclear weapons program was drawn out by its need to dissimulate efforts to acquire the requisite technology.

Fourth, negotiated arms control agreements have made the world increasingly *transparent*. The arsenal of monitoring tools is impressive – national and international technical means, commercial observation satellites, voluntary and obligatory data exchanges, on-site-inspection, human intelligence, and CNN. This growth in transparency, a great deal of it brought about by arms control agreements, enables the United States and other nations of the world to track with considerably more confidence military and technological activities of potential concern. It also makes it more difficult for potential violators to carry out clandestine programs or evade their legal obligations.

Finally, arms control agreements create pressure on nations to conform to an international *norm*. The agreements also establish a legitimate basis for response and/or intervention in the event of a treaty violation. Normative pressure was key, for example, in bringing South Africa to its decision to denuclearize, join the NPT and open its facilities to international inspection. The international norm against the proliferation of nuclear weapons also served as a rallying point for the world community to oppose North Korea's effort to leave the NPT in 1993. In addition, a widely accepted set of international norms established by the NPT, CWC and the Biological and Toxin Weapons Convention (BTWC) was key in bringing the international community to agree to deweaponizing of Iraq after the Gulf War.

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In any case, the United States has a long history of attempting to modify the interests of other states through economic incentives and disincentives. An excellent example of the "incentives" approach is the January 1994 Tri-lateral Agreement among the United States, Russia and Ukraine which led to the denuclearization of Ukraine in exchange for nuclear fuel rods from Russia (which received a U.S. advance on sales of highly-enriched uranium (HEU) derived from the warheads). Another "incentives" success also occurred in 1994 when North Korea agreed to freeze and ultimately terminate its plutonium production and reprocessing programs in exchange for proliferation-resistant nuclear power reactors.

The record seems to indicate that other North Korean activities of U.S. concern are negotiable. In September 1999, after discussions in Berlin with former Secretary of Defense William Perry, North Korea agreed to curtail its missile program in exchange for the partial lifting of economic sanctions and the normalization of diplomatic relations. North Korea has also indicated on several occasions its willingness to end missile exports in exchange for aid. Similar "incentives" could be useful in curtailing threatening missile programs in other potentially hostile states.

Cooperative Programs

Cooperative programs and policies, such as security assurances, can also help restrain potential proliferators. U.S. security relationships have long been considered a key element in dampening the desire for nuclear weapons in technologically advanced countries like Germany and Japan. U.S. security assurances, together with those of the U.K., France and Russia, were a key element – together with the economic incentives discussed above -- in convincing Ukraine in 1994 to agree to relinquish its stockpile of Soviet nuclear warheads.

With the important exception of Russia and China, nuclear weapons and missile delivery programs have been pursued by states in response to perceived regional security concerns or to gain national prestige and not in order to attack or deter the United States. The primary military purpose for the nuclear programs of India, Israel, Pakistan, South Africa, Brazil and Argentina, was to threaten regional rivals. And it was concern over the policies of a post-Soviet Russia that drove Ukraine to consider retaining the nuclear arsenal left behind on its soil after the collapse of the Soviet Union.

Cooperative programs and policies will not be appropriate in all cases. In part, the nuclear weapons (and missile delivery) programs of North Korea, Iraq, and possibly Iran (although the threat from Iraq was certainly a big factor), can be attributed to a desire to fend off U.S. interference. On the other hand, there have been many occasions when cooperative programs have made a difference in constraining the growth of the WMD and missile threat.

Export Controls

Export controls have slowed proliferation substantially over the last several decades, reducing to a handful the number of countries that might acquire WMD and long-range missiles. Export controls deter countries from acquiring nuclear weapons or attempting to build missiles and buy time against those that try. In Brazil and Argentina, for example, export controls hindered the development of long-range missiles and nuclear weapons, allowing time for civilian governments to come to power and end those weapons programs.

The NPT, CWC and BTWC, for example, have both formal and informal limits on suppliers and lists of banned or restricted exports. These arrangements make the pursuit of these weapons by a potential violator a costly, difficult and time-consuming process. These agreements also oblige the establishment of domestic legislation to criminalize activities which are banned at the international level (see Box 6.c).

The centerpiece of efforts to prevent the acquisition of missile technology is the MTCR. It is a voluntary arrangement among countries to control the export of missiles and missile technologies, components and production facilities. The regime began in the 1987 with only seven members. Today, 29 countries are members and a number of additional states have promised to adhere to the MTCR guidelines (which prevent the transfer of missiles and space launch vehicles (SLVs) capable of delivering a 500 kg payload to a range of at least 300 km).

A variety of other measures form critical links in the global effort to limit the supply of WMD technologies and missiles. For example, countries around the world seek to follow International Atomic Energy Agency recommendations specifying security measures to prevent potential bomb-making material from being stolen – and the United States is actively working to strengthen international cooperation in that area. In the former Soviet Union in particular, the collapse of the Soviet state drastically undermined controls over nuclear material, along with restraints on the export of sensitive technologies. The United States is working closely with Russia and other states of the former Soviet Union to improve security for sensitive material and strengthen export controls – efforts which represent some of the most cost-effective investments in security to be found anywhere in the U.S. budget.

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The first is that destroying facilities or missiles before launch is an act of war and would cast the United States as an aggressor. As a result, if the United States were not already at war, or if the threat did not involve an adversary suspected of possessing WMD, there could be strong inhibitions against firing the

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[29] On Dec. 18, 1998 Secretary of State Madeleine Albright stated on CNN that "our policy is to try to contain Saddam Hussein and the threat of weapons of mass destruction. But we also believe that the Iraqi people need a government that is more representative of them, and *we are talking about regime change* and working with a variety of opposition groups to try for them to help themselves to have a government that is representative and that would abide by the Security Council." [Emphasis added]

first shot. It should be noted, however, that these inhibitions did not keep the United States from attacking Sudan and Afghanistan in 1998. Second, after preemption, it might be difficult to convince other countries that the United States was acting in self-defense against an imminent attack. If the United States were perceived as "trigger happy," it might eventually find it difficult to rally international support or create "coalitions of the willing" to restrain other threats in the future. Third, the United States could act mistakenly as, apparently, was the case in the attack on the Sudanese chemical weapons facility noted above. This, too, would ultimately damage U.S. credibility and hamper U.S. efforts to respond – or to rally others to our side to reply – to subsequent threats.

Finally, the United States may not be able to find and destroy suspect facilities or missiles or their launchers. Long-range missiles that might threaten U.S. cities from bases in North Korea or Iran would likely be large, fixed targets and preemption might be reasonably effective against them. But it is more likely that threats to the United States will be generated in clandestine facilities or will come from shorter range or mobile delivery systems which can be hidden, moved and launched rapidly from undistinguishable locations.

Civil Defense

The final element of this alternative approach is for the United States to maintain the best possible emergency response teams and civil defense capabilities to minimize the loss of life in case efforts fail to deter, constrain or prevent the acquisition of WMD or the launch of missiles by a potential adversary. The effectiveness of civil defense depends primarily on the type of weapons used and the degree of planning and training that has been devoted to protecting urban populations from these weapons.

Against conventional warheads, the experiences of World War II and the Gulf War suggest that the simplest civil defense measures – moving to basements, metro systems or the center of buildings on warning of an attack – can reduce casualties by roughly 50-percent. At the other end of the spectrum of destruction, there is no effective civil defense against nuclear weapons short of evacuation, which would be possible only in the unlikely event that there was ample warning of an attack against a particular city.

In contrast to conventional explosives and nuclear weapons, both of which destroy by blast and fire although on vastly different scales, civil defense against chemical and biological weapons is relatively straightforward and effective. Gas masks provide excellent protection against all but the highest concentrations of a chemical agent. With some training of the population and warning of an attack, masks could reduce civilian casualties by up to 90-percent. Although a program to distribute masks might cost billions of dollars, the total cost would be less than that of the proposed NMD system, and far more effective – particularly against submunitions (see Chapter II).

In the case of biological weapons, medical treatment and vaccines could also reduce casualties. The U.S. health care system is the largest in the world, absorbing four times as much money as the military budget. This system, coupled with fire-fighting and other emergency response services, police, federal and local governments, the Centers for Disease Control (CDC) and the military should be able to significantly mitigate a biological weapons calamity.[30]

An additional factor mitigating the bio-weapons threat is that pathogens are extremely difficult to weaponize and to disseminate. Most pathogens cannot survive sunlight, some must be in a particular size

[30] See M.F. Perutz, "The Threat of Biological Weapons," in *The New York Review of Books*, April 12, 2000.

aerosol form to be effective and others are susceptible to destruction by the heat generated during their own delivery.[31] While an actual bio-weapon threat delivered by ballistic missile cannot be ruled out, the assault is more likely to take the form of on-site delivery by an unidentified actor than a long-range attack by a known adversary.[32]

The biggest impediment to effective civil defense against chem-bio weapons, however, would probably be political rather than technical in nature. While the implementation of useful civil defense programs should be relatively straightforward, the history of civil defense precautions against nuclear attack gives good reason to question whether the United States could carry out a serious program.

Conclusion

There exists a valid, viable and more effective alternative to NMD for dealing with the potential WMD-ballistic missile threat. This alternative consists of strengthening the interlocking and complementary barriers to WMD and missile proliferation created by deterrence, arms control (including transparency measures), economic incentives, cooperative programs, export controls, preemption and civil defense. Together, these various responses create a very powerful impediment to an identifiable WMD and long-range missile threat to the United States if or as one eventuates.

This alternative has three quite significant advantages over NMD. First, unlike NMD, the component parts of this alternative approach are already in place, have a record of success, and benefit from large-scale international political, financial and technical participation. Second, unlike NMD, elements of the alternative approach – such as transparency measures, civil defense and criminalization – are applicable against a broad spectrum of threats, including non-identifiable actors and short-range delivery systems. NMD, on the other hand, responds only to a specific – and the most unlikely threat – to U.S. security. Third, again unlike NMD, most – although not all – of the component parts of this alternative approach are mutually reinforcing and viewed as legitimate efforts to strengthen global security.

There are, in sum, excellent alternatives to NMD for protecting the United States from potential threats. These alternatives enjoy wide-spread support, have enhanced the security of the United States and other nations and should be vigorously pursued. The U.S. NMD program, on the other hand, is viewed by many governments, both friendly and critical, as a retreat by the United States from international efforts to constrain the threat of proliferation, as undercutting arms and export control agreements and as disrupting key strategic relationships. The generally negative reaction to NMD deployment (and concern about the ensuing vitiation of the ABM Treaty) jeopardizes vital support for many of the alternatives for dealing cooperatively with the threat of ballistic missiles and WMD and weakens existing, carefully constructed barriers to proliferation

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[31] As one university professor put it, “I am a trained biochemist and have written on biological warfare for 30 years, but I would have no idea how to build a biological weapon."” *Washington Post*, April 2, 2000, p. A20.

[32] The proponents of NMD are divided over this issue. In the Spring 2000 *Foreign Policy* (p. 196) Sen. Thad Cochran (R-Miss.) writes, “[T]he critics say our system “cannot defend against ICBMs carrying biological or chemical agents packaged in submunitions.” There is no evidence in the intelligence estimates cited by the concerned scientists that any rogue states are developing such a capability or that they could do so anytime soon.” According to the Rumsfeld Commission, however, "All of the nations whose programs we examined that are developing long-range ballistic missiles have the option to arm these, as well as their shorter range systems, with biological or chemical weapons. These weapons can take the form of bomblets as well as a single large warhead."

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