Beyond the ABM Treaty:
A Plea For a Limited National Missile Defense System

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2002-03
March 2002

International Security Program
Belfer Center for Science and International Affairs

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This paper may be cited as: Tom Sauer. "Beyond the ABM Treaty: A Plea For a Limited National Missile Defense System." BCSIA Discussion Paper 2002-03, Kennedy School of Government, Harvard University, March 2002.

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NOTE FROM THE AUTHOR

This paper was written thanks to a research grant provided by the Institute for Security Studies (Paris) of the Western European Union (WEU)(now European Union) in 2001. I would like to thank Julian Lindley-French for his comments.

Please note that there are two tables included in this paper: Table 1: Four missile defense options, on page 18; and Table 2: Assessment of the U.S. missile defense options, on page 56.

1. Introduction

With approval rates higher than ever thanks to the war against terrorism, President George W. Bush finally did in December 2001 what he had threatened to do on different occasions but what many others thought - or hoped - was only bluff: withdrawing unilaterally from the 1972 Anti-Ballistic Missile (ABM) Treaty. Regardless of the rationale or emotions behind or against this decision, it ended a period of uncertainty. Although in principle the Bush administration can still change its mind until June 2002 when the six months withdrawal period expires, most observers believe that this will not happen. Indeed, there are already plans on the table to start building a new test site at Fort Greely in Alaska in the Summer of 2002 that from 2004 onwards could be used as a base for a small ground-based mid-course National Missile Defense (NMD) launch site if needed.

Another advantage of this drastic decision is that it forces other nuclear weapons states to reconsider their existing arms control and nonproliferation policies. This study seeks to establish new limits to both offensive and defensive strategic weapons and aims to set limits to the deployment of NMD. Without such limits, the strategic balance between the major powers in the world - the United States (and its allies), Russia and China - might be in danger.

The Bush administration has not yet made a decision about the specific missile defense architecture. There is now a window of opportunity to think through a whole range of scenarios, both technologically and politically speaking. The odds are that the United States will not formulate a detailed plan in the foreseeable future, but that it will respond in an ad hoc way to the progress made in the ongoing and expanding research and development (R&D) and testing programs. It will leave all the options - including ground-, sea-, air-, and space-based systems like radars, sensors and interceptors - open. In addition to the mid-course system that was initiated by the Clinton administration, President Bush would also like to add boost-phase and terminal-phase systems. The latter are additional defensive layers on top of the mid-course system.

Before judging which architecture is technologically and financially most viable and at the same time consistent with the international political constellation, I describe the basic options for such a missile defense architecture.

2. Four missile defense options

Generally, two distinctions are put forward with regard to categorizing ballistic missile defense: (1) between theatre missile defense (TMD) and national missile defense (NMD) on the one hand; and (2) between "limited" and "extensive" NMD on the other, concepts which most of the time are not further specified.

This paper argues that there are three major thresholds, resulting in four - instead of three - basic missile defense scenarios.

The first basic threshold is the barrier above which a missile defense system is not limited to defend only against short-, and medium-range missiles. This distinction does not correspond to the difference between TMD and NMD, because some TMD systems can be used against strategic (or intercontinental) missiles.[1] It is for this reason that the current proposals[2] to limit missile defense to TMD are dangerous from an arms control perspective as the odds are that the United States will deploy some kind of NMD in the future as well.

A difference should be made between lower-tier and upper-tier TMD. NMD coupled with upper-tier TMD (in contrast to lower-tier TMD) systems may provide the United States with a rapid

[1] NMD is confusing because what is mostly meant is strategic missile defense. In the case of the US, NMD corresponds *de facto* to strategic missile defense because of its geographical situation. For countries like Israel, TMD fulfills its basic needs. In this paper, however, we continue to use NMD and strategic missile defense as synonyms because this paper focuses on US missile defense.

break-out capability, able to expend NMD from a limited to an extensive one rather easily and quickly. The latter has to be outlawed in all circumstances because it is destabilizing from an international point of view (see further).

As already stated, a more useful distinction is between systems able to defend against strategic (or intercontinental) missiles and systems that are not. Only the United States, Russia, China, France and the United Kingdom - the five permanent members of the United Nations Security Council and also the formal Nuclear Weapon States according to the Nuclear Non-Proliferation Treaty (NPT) signed in 1968[3] - currently possess strategic missiles.

A second distinction that should be made is between a strategic missile defense system that is not capable of defending against more than a couple (say between five and ten, and at most twenty) strategic missiles, on the one hand, and a more powerful missile defense system, on the other hand. This distinction is made because the most frequently cited threat by the United States is an attack by states like Iraq, Iran or North Korea, possessing probably only a very limited number of strategic missiles armed with weapons of mass destruction in the future.[4] In principle, the least capable option of the two should not be perceived as threatening to Russia and even China, the latter currently only possessing twenty ICBMs able to be armed with nuclear warheads.

A third threshold, which is less relevant in the short and medium term, is between extensive and less extensive NMD systems. The former includes all possible technologies one can think about

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[2] Sam Nunn, "Our new security framework," *Washington Post*, October 8, 2001, p.A23; William Perry, "Preparing for the next attack," *Foreign Affairs*, Vol.80, No.6 (November/December 2001), p.44.

[3] Treaty on the Non-Proliferation of Nuclear Weapons, Resolution 2373, 1968.

[4] In the nineties, the United States defined states that choose to assault basic values, to be aggressive, to suppress basic human rights, to promote radical ideologies and to embark on ambitious military programs including weapons of mass destruction first as "rogue states", a concept that was leter replaced by the term "states of concern". President George W.Bush called Iraq, Iran and North Korea an "Axis of Evil" in his State of the Union speech in January 2002.

at the moment, including space-based (laser) weapons. The latter is limited to those technologies that are most mature and within reach to be deployed, let's say, within a decade.

Based on these thresholds, four different and gradually more capable U.S. missile defense types could be envisaged: (1) lower-tier TMD systems; (2) a limited NMD system without rapid break-out capabilities; (3) a limited NMD system with rapid break-out capabilities; and (4) an extensive NMD system. Each option includes the components of the former option. In practice, there are of course many more missile defense scenarios, but all of them can in principle be categorized as one of these four options.

Option one: Lower-tier TMD systems

The so-called lower-tier theatre missile defense (TMD) systems are meant to defend only against short-, or medium-range missiles. Their interceptors have a maximum speed of 3 km/s[5] and are endo-atmospheric: they do not intercept warheads beyond the atmosphere. For the United States, these systems are only useful in the context of military interventions abroad as part of a force protection package.

Until recently, there were two U.S. lower-tier TMD systems in the pipeline: Patriot PAC-3 and Navy Area Defense, the successor to the sea-based Aegis air defense system. However, due to technological difficulties, the Navy Area Defense program was canceled in December 2001.

There are also cooperative TMD programs such as the Medium Extended Air Defense System (MEADS)[6] with Germany and Italy, and the Arrow system with Israel.

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[5] As agreed upon during the so-called demarcation agreements between the United States and Russia.

[6] MEADS is the successor of the Hawk-system and is meant to be used for air defense and defense against short-range ballistic missile attacks, cruise missiles and aircraft. Contrary to the Patriot PAC-3, MEADS is transportable by C-130s.

Patriot PAC-3

The U.S. Army Patriot system was originally built as an air defense system. As it was not specifically designed for ballistic missile attacks, it is not surprising that the Patriot PAC-2, with a radius of the defended area of 10-15 km, did not destroy many Iraqi Scud warheads during the Gulf War, despite claims to the contrary.[7] Patriot PAC-3, currently under development and scheduled for full-rate production in 2002, went through some substantial improvements, and with a radius of at least 40-50 km can defend a larger area than the PAC-2. PAC-3 is a hit-to-kill system, i.e. interception by direct impact (unlike PAC-2, which uses explosives), that can be used against short-range ballistic missiles and cruise missiles. The Netherlands, Germany, and Greece have already shown interest in buying PAC-3.

Option two: A limited NMD system without rapid break-out capabilities

In contrast to the former option, option two would in principle defend U.S. territory against an attack that consists of a couple (at most twenty) strategic or intercontinental missiles, having a range of more than 3,500 km and a speed of at least 5 km/s. Option two does not have the technological base to become an extensive NMD system quickly.

Even a limited NMD system can consist of different types of missile defense parts. Strategic missile defense can focus on one or more phases of the offensive missile flight: boost-phase (the

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The hit-to-kill programme however is encountering technical problems. Deployment of MEADS should not be expected before 2010.

[7] Even former Secretary of Defense William Cohen admitted that the Patriots 'did not work'. John Farrell, "The Patriot Gulf missile 'didn't work,'" *The Boston Globe*, January 13, 2001; for an earlier account on this, see Ted Postol, "Lessons of the Gulf War experience," *International Security*, Vol.16, No.3 (Winter 1991/1992).

first couple of minutes); mid-course; and/or terminal phase. A ground-based mid-course system combined with boost-phase systems is a part of most NMD scenarios.

A strategic *ground-based mid-course missile defense system* consists of the following components:

a) geo-synchronous satellites at 36,000 km height that are able to detect enemy missile launches, and early-warning radars that can follow-up the attack;

b) ABM radars (and/or space-based sensors) for guiding the interceptors. Contrary to early-warning radars which have a 5-10 m resolution, X-band ABM radars have a resolution of 10-15 cm, useful for discrimination between warheads and decoys;[8]

c) a C4I battle management center including fast computers able to analyze the enormous amount of information coming from radars and satellites, to discriminate warheads from decoys, to forecast missile trajectories and to send this information to the ABM radars, to adapt all incoming information instantaneously, and to do a *post facto* kill assessment;

d) communication systems around the country;

e) fast interceptors with a speed of 7-8 km/s consisting of a three-stage missile booster;

f) exo-atmospheric kill vehicles (EKV) - with sensors for discrimination and in contact with the battle management center - on top of the interceptors,[9] designed to collide with the target at a speed of 15 km/s (54,000 km/h); and

g) defense systems to protect ABM components.

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[8] Ted Postol, "The target is Russia," *The Bulletin of the Atomic Scientists*, Vol.56, No.2 (March/April 2000). However, the main instrument discriminating decoys from real warheads are the sensors on the exo-atmospheric kill-vehicle (EKV).

[9] At 1.000 km away from the target, the EKV resolution is 150-300 meters; at 10 km 1.5-3 meters (while a Mark 12A warhead on a Minuteman ICBM is 1.83 meter long with a base of 22 inches); at 3-6 km, the EKV has under half a second to manoeuvre before impact. In: Col.Dan Smith, 'Technological challenges in NMD', Center for Defense Information, www.cdi.org/hotspots/issuebrief/ch4/, accessed in October 2000.

To be able to perform the aforementioned mission, the following components are needed for protecting the United States against a small-scale ballistic missile attack:

a) an unlimited number of simple early-warning satellites (without sensors for guiding), such as the Defense Support Program (DSP) satellites, which are planned to be replaced by six Space Based Infrared System (SBIRS)-high satellites in 2004;
b) the five existing early-warning radars[10] in Cape Cod, Massachussetts; Beale, California; Clear, Alaska; Thule, Greenland; and Fylingdales, United Kingdom;
c) one X-band ABM radar in Grand Forks, North Dakota;[11]
d) eighty to one hundred mid-course exo-atmospheric hit-to-kill interceptors deployed at Grand Forks, North Dakota;[12]
e) NORAD in Cheyenne Mountain, Colorado as battle management center;
f) three in-flight interceptor communication systems around the United States; and
g) defensive systems to protect ABM components.

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[10] If these early-warning radars are upgraded, something which cannot be verified with National Technical Means (NTM) by other states, they can help with guiding the interceptors to their targets.

[11] An alternative location is Shemya in the Western Aleutians in Alaska, as planned under the C-1 Clinton system. The advantage, however, of having a NMD system based in Grand Forks is that continental US territory (48 states) can be better protected against attacks from both North Korea *and* the Middle East.

[12] Assuming (1) a 5 to 1 interceptor/attacking missile ratio; (2) an increase from 20 to 200 Chinese nuclear warheads able to reach the US by ICBMs in the future; (3) a minimum deterrence logic that says that China needs only be able to "successfully" retaliate with a couple of nuclear warheads. Of all the Nuclear Weapon States, the Chinese came closest to accepting this logic of minimum deterrence during the Cold War. It stands in contrast to the mainstream idea that deterrence is 'difficult' requiring a lot of nuclear weapons (maximum deterrence). The concepts 'easy'/'minimum' and 'difficult'/'maximum' deterrence are taken from: Barry Buzan, *An introduction to strategic studies* (London: Macmillan, 1987). These concepts are further elaborated in: Tom Sauer, "Nuclear Inertia. US Nuclear weapons policy after the Cold War (1990-2000)" (PH.D. dissertation, Catholic University of Leuven, Belgium, 2001), chapter 1.

Except for the location of the interceptors, this system corresponds more or less to the first stage - the so-called Capability-1 (or C-1) - of the NMD system planned by the Clinton administration, when it took the decision in 1999 to deploy a limited NMD system "as soon as technologically possible". That decision was in turn heavily influenced by the passing of the 1999 National Missile Defense Act.

A possible additional layer: boost-phase missile defense

The major problem with a mid-course defense system is the existence of countermeasures.[13] In a joint report by the Union of Concerned Scientists (UCS) and the MIT Security Studies Group, scientists explain in detail three specific effective countermeasures against a mid-course NMD system that are not very difficult to construct:[14]

a) packaging biological or chemical weapons in dozens of small sub-munitions that can be released immediately after boost-phase;
b) disguising the nuclear warhead, for instance by enclosing it in a balloon coated with a thin layer of metal; as a result, any object the size of a warhead could be a credible decoy (anti-simulation);
c) covering the nuclear warhead with a thin shroud cooled with liquid nitrogen that would make it invisible to the heat-seeking interceptor.[15]

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[13] George Lewis and Ted Postol, "Future challenges to ballistic missile defense," *IEEE Spectrum* (September 1997); George Lewis, Ted Postol and John Pike, "Why national missile defense won't work," *Scientific American* (August 1999); Richard Garwin, "The wrong plan," *The Bulletin of the Atomic Scientists*, Vol.56, No.2 (March/April 2000), pp.36-41; Vernon Loeb, "Antimissile system is called 'non-defense,'" *Washington Post*, April 12, 2000, p.A15.

[14] Andrew Sessler, ed., *Countermeasures. A technical evaluation of the operational effectiveness of the planned US National Missile Defense system* (Union of Concerned Scientists/MIT Security Studies Program, April 2000), 175 p.

[15] George Lewis, "Will NMD work? The problem of countermeasures," paper presented at Association française du Mouvement Pugwash/Fondation pour la Recherche Stratégique, Paris, April 6, 2001.

Other countermeasures include putting more than one warhead on top of a missile (MIRV'ing), chaff clouds, jammers, debris, target maneuvers, and "underflying" using depressed trajectories. Richard Garwin concludes: "Any nation that can build an intercontinental ballistic missile can construct countermeasures that could easily defeat [a ground-based mid-course system]."[16] Even the U.S. National Intelligence Estimate (NIE) of 1999 stated that Russia and China already had countermeasures and that North Korea could as well in the near future.[17]

For this reason, a *boost-phase* missile defense system can be added to a mid-course system. With a ground-, sea- and/or air-based boost-phase system that attacks the offensive missile immediately after launch, the attacking missile is more vulnerable because it is still relatively slow, visible with infrared and large, losing all stages only at a height between 200-300 km.[18] The sensor requirements for a boost-phase system therefore have to be less advanced than for a mid-course system. The offensive missile is easier to hit because there are no countermeasures (like decoys) at this stage. In addition, the Russian and Chinese ICBMs will remain invulnerable (in contrast to a mid-course system) as they are stationed in the center of their countries and boost-phase missile defense systems need to be close to their targets.

Despite some major interest by the current U.S. administration in a boost-phase system, it has at least eight disadvantages. First, there is only a window of three to five minutes of which one to one and a half minutes are needed for detection and assessment. This implies the need for very fast interceptors (8-9 km/s), which do not yet exist. Because of the short-reaction time it enhances crisis

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[16] Richard Garwin, "The wrong plan," p.36.

[17] George Lewis, "The US NMD program," in Joseph Cirincione, ed., *White Paper on National Missile Defense* (Lawyers Alliance for World Security, 2000), p.6.

[18] In principle, space-based boost-phase systems are also developed. For reasons explained further, it will be described under option four.

instability with the substantial risk of miscalculations, and it implies command and control difficulties (like pre-delegation). Second, in this stage the offensive missile is accelerating and its trajectory is therefore more difficult to predict than during mid-course when the trajectory can be easily calculated. Third, the system has to be installed near launch sites, which requires the agreement of neighboring states. In the case of North Korea this problem would be manageable because the missile defense site can be ground-based in Russia or sea-based in the Sea of Japan. Against Iraq, a ground-based site in the East of Turkey or a sea-based system in the Black and/or Mediterranean Sea is required. Against Iran, however, two bases would be needed: one ground-based in Turkmenistan, Kazakhstan or Uzbekistan or sea-based in the Caspian Sea for covering the northern part, and one ground-based site in Saudi-Arabia, Oman or the United Arab Emirates or a sea-based system in the Persian Gulf or the Gulf of Oman for covering the southern part of Iran. All this will not be evident. In addition, the defensive systems are vulnerable to attacks because they are always present in a relatively small region. Fourth, a boost-phase system should always be on alert, which is extremely expensive, especially for sea-, and air-based systems. The high alert-rates enhance the risks of accidents, unauthorized use, and authorized use after false alarms. Fifth, the difficulties enhance significantly when there are offensive missiles launched at the same time from different places. Sixth, the warhead itself will most likely not be destroyed (contrary to a mid-course system) and where it will land will be difficult to predict. Seventh, the SLBMs of Russia and China may be vulnerable in port. Eight, the technology is far from ready. As Cirincione argued in 2000: "None of the two current sea-based missile defense systems are configured for boost-phase intercept. The Navy Area system is designed to attempt intercepts of short- and medium-range missiles in the midcourse and terminal phase of the missile's flight. It is designed to provide site defense of ports, airfields, and staging areas….The [Navy Theater Wide] system…designed to

attempt intercepts outside the atmosphere in the midcourse of an intermediate-range ballistic missile's flight."[19]

A boost-phase system that is currently in the development pipeline by the Air Force is the Airborne Laser (ABL).[20] Current estimates for ABL deployment are 2010.[21]

Boost-phase systems should be designed in such a way that they cannot be adapted to turn a limited ground-based NMD system into an extensive one in a relatively short time. This implies limiting the range (allowing only endo-atmospheric) and the number of boost-phase interceptors. O'Hanlon and Lindsay for instance propose 50 mid-course and 150 boost-phase interceptors for a US NMD system in total.[22]

THAAD

An upper-tier TMD system can be added to these mid-course and boost-phase NMD. Of the two major upper-tier TMD systems, the least powerful in respect to the risk of rapid break-out and therefore most useful is Theater High Altitude Air Defense (THAAD). THAAD is a mobile, land-based U.S. Army system meant to destroy hit-to-kill, medium-range missiles between 40-150 km height, using interceptors with a maximum speed of 2.6 km/s. THAAD would be able to defend against a surface ten times as large as the Patriot PAC-2. It was decided in early 2000 that fourteen THAAD radars and 1,200 interceptors would be deployed in 2007-2008. Because THAAD can in

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[19] Joseph Cirincione, "Lost at sea," *Carnegie Endowment report*, September 6, 2000. As already stated above, the Navy Area Defense program has been canceled in December 2001.

[20] Richard Garwin, however, prefers a ground-, or sea-based boost-phase system. In: "The wrong plan."

[21] Michael O'Hanlon, "US missile defense programs," paper presented at the Nautilus Institute/UN University conference, June 24-25, 2000, www.nautilus.org/nukepolicy/TMD-Conference/ohanlonpaper.txt/, accessed in November 2000.

[22] Michael O'Hanlon and James Lindsay, "A plan for a limited NMD," *Brookings Policy Brief ,* February 2001, pp.1-12.

principle become a strategic missile defense system if coupled to SBIRS-low satellites and/or ABM X-band radars (or even upgraded early-warning radars), this combination should be prohibited and the number of THAAD interceptors should be limited to 600[23] and not be tested against strategic-range missiles.

To conclude, the potential for rapid break-out toward an extensive NMD system is limited for option two due to the absence of space-based weapons, space-based sensors (such as SBIRS-low satellites), upper-tier TMD systems with the capability to be used against strategic missiles like Navy Theater Wide (NTW), and a whole constellation of ABM X-band radars (see option three).

Option three: NMD with rapid break-out potential

Option three could defend against dozens of missiles. It *adds* the following elements to option two:

a) one hundred and fifty additional interceptors of which 25 would be based in North Dakota and 125 based on a second site, for instance Alaska, giving the United States 250 mid-course interceptors;
b) one additional early-warning radar (in South-Korea), i.e. six early-warning radars in total;
c) eight additional X-band ABM radars (including one in Greenland, the United Kingdom and South Korea), i.e. nine ABM X-band radars in total;

[23] Dean Wilkening, "Ballistic-missile defense and strategic stability," *Adelphi Paper*, No. 334 (May 2000), p.58. Wilkening places the limit between 600 and 800 interceptors. He also recommends confidence and security building measures that allow the Russians to verify whether THAAD is not coupled to highly capable sensors. George Lewis doubts whether such measures are feasible in practice. See Harold Feiveson, ed., *The nuclear turning-point* (Washington, D.C., Brookings Institution, 1999), p.89.

d) twenty-four Space-Based Infrared System (SBIRS)-low satellites with space-based sensors;

e) Two additional SBIRS-high satellites, i.e. six SBIRS-high satellites in total.

This system corresponds with the combined C-2 and C-3 phases of the Clinton NMD system. Beside a more extensive mid-course, this option also includes Navy Wide Theater (NTW) upper-tier NMD systems. The 650 NTW interceptors with a speed of 4.5 km/s scheduled to be stationed on sixty Aegis cruisers or destroyers, with radars on board, would be able to intercept medium-range missiles in all phases, although ideally between 80-100 km height. NTW is supposed to be deployed in 2010.

The main characteristic of this third option is that this "limited" NMD system can easily be expanded into an extensive NMD system able to defend against tens or even hundreds of strategic missiles. The key components for break-out are: (1) SBIRS-low satellites; (2) multiple X-band ABM radars; (3) NTW; and, to a lesser extent (4) THAAD.

SBIRS-low satellites – the successor of the "Brilliant Eyes" Strategic Defense Initiative (SDI) program in the eighties - are capable of not only tracking offensive missiles during all phases, but also guiding interceptors and helping with discrimination between decoys and warheads using infrared and visible light. As it is relatively easy to produce and deploy additional interceptors, the major difficulty for break-out – the time required to build radars – would disappear as SBIRS-low satellites can easily take over the role of ABM radars. Deployment of SBIRS-low satellites is not foreseen before 2010. A General Accounting Office (GAO) report of March 2001, however, stated that there "is a high risk of not delivering the system on time, at cost, or with expected performance."[24]

NTW interceptors have a velocity that approaches the speed of strategic missiles (5 km/s) and can cover areas with a diameter of hundreds of kilometers. In addition, the kill vehicle for NTW

[24] Paul Richter, "GAO shoots holes in plan for deployment of missile defense system," *Los Angeles Times*, March 3, 2001.

– the Light Exo-Atmospheric Projectile (LEAP) – was originally developed for strategic purposes. Coupled with *X-band ABM radars* and/or SBIRS-low satellites, NTW can be upgraded from a TMD to a *de facto* NMD system. This is also acknowledged in a Ballistic Missile Defense Organization (BMDO) report of 1999.[25] Lewis and Gronlund state: "Even if the [ABM] treaty were modified to permit only a limited NMD, the changes required to permit the C-2 and C-3 systems would also facilitate the circumvention of the treaty limits by interceptors that were nominally intended for theater missile targets."[26] Even Henry Cooper, one of the SDI's founding fathers, admitted: "If positioned off the US coast with sufficiently long-range interceptors and adequate sensor support, sea-based defenses could defend the entire US against a limited number of missiles launched from anywhere on earth, including China or the former Soviet Union."[27] At most, five NTW ships off the U.S. coast would be sufficient to defend the entire country.[28] It is not by chance that there was no agreement between Russia and the United States concerning the upper-tier TMD systems in 1997, especially with regard to NTW.[29]

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[25] Ballistic Missile Defense Organization (BMDO), *Summary of Report to Congress on utility of sea-based assets to NMD*, June 1, 1999.

[26] George Lewis and Lisbeth Gronlund, "How a limited National Missile Defense would impact the ABM treaty," *Arms Control Today*, Vol.29, No.7 (November 1999), p.12 ; see also George Lewis and Ted Postol, "Portrait of a bad idea," *The Bulletin of the Atomic Scientists,* Vol.53, No.4 (July/August 1997), pp.18-25; James Glanz, "Now for plan B: US could expand 'theater anti-missile systems," *International Herald Tribune*, September 5, 2000.

[27] Henry Cooper, "To build an affordable shield," *Orbis,* Vol.40, No.1 (Winter 1996).

[28] George Lewis, "Ballistic Missile Defense Issues", paper presented at MIT Security Studies Program, November 1997, slide 30; Harold Feiveson (ed), *The nuclear turning-point*, p.89.

[29] Lisbeth Gronlund, "Just kicking the can," *The Bulletin of the Atomic Scientists*, Vol.54, No.1 (January/February 1998), pp.15-16.

The recent interest in a sea-based mid-course system on Aegis ships is modeled on a concept that would use a variant of NTW interceptors. That system, however, "would have all of the same vulnerabilities [as a land-based, mid-course system], but would be even less effective because of the smaller size and more limited capabilities of its individual components", according to George Lewis.[30]

Like NTW, *THAAD* may also transform itself into a strategic missile defense system if coupled with SBIRS-low satellites. General Malcolm O'Neill, the former Head of BMDO, stated in 1994: "Analysis indicated that in one-on-one engagements against [re-entry vehicles] deployed on some strategic missiles, THAAD if cued from space, would have a capability to counter a non-trivial portion of Russia's strategic force."[31] However, its slower speed makes THAAD less worrisome than NTW from a break-out point of view, especially if the numbers of THAAD interceptors remain limited.

As Lewis and Gronlund said: "The multiple X-band radars and the SBIRS-low satellite system that would be deployed as part of the [Clinton] C-2 and C-3 systems would constitute a complete sensor infrastructure and, therefore, completely eliminate the [ABM] treaty's ability to control breakout. This sensor network would be able to support a much larger system that deployed many hundreds or even thousands of interceptors."[32]

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[30] George Lewis, "NMD options for the Bush administration," paper presented at the Association Française du Mouvement Pugwash/La Fondation pour la Recherche Stratégique, Paris, April 6, 2001.

[31] George Lewis, "Ballistic Missile Defense Issues", slide 32.

[32] George Lewis and Lisbeth Gronlund, "How a limited National Missile Defense would impact the ABM treaty," *Arms Control Today*, Vol. 29, No.7 (November 1999), p.12.

Option four: An extensive NMD system

Option four is an extensive NMD system that corresponds to option three but without numerical limits. It also adds space-based weapons (such as lasers) that are currently not planned for deployment before 2020.

Conclusion

Which of the four options is the most desirable (and feasible)? There is no consensus on this, even within the United States. While many Republicans favor option three or four or similar scenarios, the Clinton administration opted for option three in the long-term (ten years), option two in the medium-term and option one in the short-term. In the absence of pressure by the Republicans, the Clinton administration would probably not have opted for option three. During the first months of the Clinton administration, research and development funds for NMD were scaled *back* and the emphasis laid on TMD systems.

Table 1: Four missile defense options

	Option one: lower-tier TMD	**Option two: limited NMD without rapid break-out**	**Option three: NMD with rapid break-out potential**	**Option four: extensive NMD**
TMD/NMD	TMD	TMD + NMD	TMD + NMD	TMD + NMD
Number of offensive strategic missiles that can be neutralized	0	10-20	tens	hundreds
Ground-, sea-, air-, and/or space-based interceptors	Ground	Ground + sea + air	Ground + sea + air	Ground + sea + air + space
Number of ground-based mid-course sites	0	1	2	2+
Number of (upgraded) early-warning radars	(5)	5	6	6+
Number of X-band ABM radars	0	1	9	9+
Number of strategic ground-based interceptors	0	tens (max 100)	hundreds	thousands
THAAD	No	Yes	Yes	Yes
NTW	No	No	Yes	Yes
Space-based sensors (SBIRS-low)	No	No	Yes	Yes
Early-warning satellites (DSP or SBIRS-high)	Yes	Yes	Yes	Yes

3. Assessment of missile defense options

This section analyzes which of the four options is the most desirable and feasible from four angles: (a) technological feasibility; (b) cost; (c) threat perception, and (d) strategic stability.

a) Technological feasibility

While the technology does not yet exist for the four missile defense options (except maybe for option one), all the systems outlined above are feasible from a physics point of view. The technological difficulties basically boil down to engineering and information technology (IT) problem-solving. No major technological breakthroughs, apart from laser-technology, are necessary.

The level of technological difficulty differs from option to option, growing with each one. Option one can in principle be deployed earlier than option two (and so on). Indeed, most lower-tier TMD systems (Patriot PAC-3 and Arrow), except MEADS, are scheduled to be deployed before 2004. The deployment date for option two *excluding* boost-phase and upper-tier TMD could be 2007, and for option three, 2011; if boost-phase and upper-tier TMD are included, the date will be pushed past 2010 for both options. Option four, including space-based lasers, is at least two decades away. These are estimates formulated late in the Clinton administration.

While the Bush administration may speed up research and development for some or all of the systems, it is unlikely that deployment will be much sooner than previously envisaged. The reasons are twofold: first, more money does not mean that the technology will be available sooner. This was exactly the message of the February 1998 Welch panel that pointed out that the tight R&D schedule was a "rush to failure". Technology has to be tested and analyzed in a rigorous way, or else, it may not work.

Second, most - if not all - weapons programs run into difficulties and push back deployment dates. Before two THAAD tests finally succeeded, six had failed as well as four of its predecessor,

the LEAP.[33] The same applies to the existing ground-based mid-course program. The planned deployment date of the C-1 stage of the Clinton plan, which corresponds to part of option two, moved from 2003 to 2005 then to 2006 or 2007 in less than two years. In general, two out of five NMD intercept tests have failed, and the three that worked did not accurately replicate real-world conditions. Every warhead that has been intercepted so far carried a Global Positioning System (GPS) beacon that clarifies its position to the ground computers. After the first successful test in October 1999, Joseph Cirincione testified in Congress: "The target followed a pre-programmed flight path to a designated position; the interceptor missile also flew to a pre-programmed position; a GPS receiver was placed on the target to send its position to ground control, and the necessary threat location information was updated to a computer in the kill vehicle; and the decoy released had a significantly different thermal signature than the target, making it easier for the sensors on the kill vehicle to distinguish between the objects."[34] After the second "successful" test of July 2001, Senate Majority Leader Tom Daschle stated: "We knew who was launching, where it was being launched from, when it was being launched, what was being launched, and the flight path it would take. For good measure, there was a homing beacon on the target missile."[35] In addition, the X-band radar did not work and the kill-assessment was wrong. The third "successful" test, in December 2001, was twice postponed because of weather circumstances.

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[33] For a good overview of the success rate of US missile defense tests, see Andrew Sessler, ed., *Countermeasures*, Appendix J.

[34] Joseph Cirincione, "Realistic tests needed to validate performance of missile defense systems," Government Reform Subcommittee on National Security, Veterans Affairs, and International Security, testimony on September 8, 2000.

[35] Tom Daschle, "A new century of American leadership", remarks at the Woodrow Wilson International Center for Scholars, August 9, 2001, www.senate.gov/~daschle/pressroom/speech/01/08/2000809.htm.

Also the missile defense early warning satellite development program - both the SBIRS-low and SBIRS-high - is in disarray.[36]

More fundamentally, according to Dr. Ted Postol (MIT), the missile defense community (including the Missile Defense Agency and contractors) hides facts and misrepresents test results. Postol, referring to the IFT-1A test, said that Department of Defense officials "are systematically lying about the performance of a weapon system that is supposed to defend the people of the US from nuclear attack."[37] Nira Schwartz who worked for Thomson Ramo Wooldridge (TRW), a missile defense contractor, pointed out that her company "knowingly made false test plans, test procedures, test reports and presentations to the government."[38] After refusing to keep quiet, she was fired. The charges by Postol and Schwartz that the technology - in contrast to how it was presented - was not successful, have been confirmed by a report of the General Accounting Office (GAO) in February 2002[39].

Furthermore, the technological requirements depend on the capabilities of the enemy, in particular its ability to build countermeasures. The first phase of the Clinton system, for instance, was designed to destroy a few "simple" warheads, without complex decoys, effectively. As mentioned, the problem is that any nation capable of producing an ICBM and fitting it with a nuclear warhead is also capable of building more than simple countermeasures to override the United State's defense system. That is also the reason why option two includes boost-phase defense, against which countermeasures are not available, as a second layer.

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[36] Tony Capaccio, "Missile defense early warning systems in disarray, panel says," *Bloomberg News*, November 7, 2001.

[37] William Broad, "Antimissile testing is rigged to hide a flaw, critics say," *New York Times*, June 9, 2000.

[38] William Broad, "Ex-employee says contractor faked results of missile tests," *New York Times*, March 7, 2000.

[39] General Accounting Office, *Missile Defense: Review of Allegations about an Early National Missile Defense Flight Test*, GAO-02-125, February 28, 2002.

Moreover, a system can be effective according to the test criteria, but not work in real-time. The Patriot system succeeded on all seventeen of its tests, but failed during the Gulf War. As George Lewis rightly states: "The problem is NOT whether it is possible to 'hit a bullet with a bullet' or whether it is possible to hit warhead targets on a test range….The problem of achieving effective defense against an adversary that attempts to defeat the system is a *qualitatively different* and much more difficult problem."[40] Former Secretary of Defense William Perry agrees: "Experience with other military systems, moreover, suggests that they achieve their best performance only after significant use in combat conditions."[41] This goes to the heart of the question about an offense-defense arms race. For exactly the same reason, John Steinbruner is extremely skeptical about the effectiveness of NMD: "There is no realistic prospect that an NMD system could perform as advertised over the foreseeable future – *a couple of decades or more*."[42] According to Philip Coyle, Director of Operational Test and Evaluation in the Clinton administration, none of the systems - including the lower-tier TMD systems[43] - have been put through a realistic operational test program.

It is one thing to *believe* that the system works, but it is another to know that it actually does. The degree of optimism with regard to the effectiveness of NMD among some of its advocates is remarkable. For instance, one analyst initially admits: "[A multi-tiered system à la Bush] involves unproven boost-phase and sea-based interceptors, and it involves an enormous integration and engineering challenge". But he continues: "However, technologically speaking, this concept *should* be

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[40] George Lewis, "Will NMD work?" My emphasis.

[41] William Perry, "Preparing for the next attach," p.38.

[42] John Steinbruner, "National Missile Defense: Collision in Progress," *Arms Control Today*, Vol.29, No.7 (November 1999), p.3. My emphasis.

[43] In a first series of realistic operational tests in February 2002, two out of three PAC-3 missiles missed their target. "Officials evaluate missile test," *Associated Press*, February 16, 2002.

feasible. Missile defense is essentially an information problem."[44] More implicitly, William Martel recommended: "The United States should develop defensive systems to protect itself, its allies, and overseas military forces from nuclear attack. *If states realize that it is not practical* to attack the United States or its military forces with nuclear weapons, and that they are vulnerable to preemptive attack by smart conventional munitions or nuclear weapons, the military and political utility of nuclear weapons will fade."[45] The question is of course whether states outside the United States will believe that NMD will work. That the answer will be "yes" is extremely doubtful.

To conclude, from a technological point of view option one (lower-tier TMD) is preferable. In case a strategic missile defense system has to be chosen, a limited NMD system without a rapid break-out capability (option two) should be the first choice as it is the least difficult to build from a technological point of view.

b) Financial cost

While the Clinton administration spent around $ 4 bn on NMD each year, President Bush plans to spend $ 8.8 bn each year starting in FY 2002, an increase of 57 percent. While proponents of missile defense argue that the current NMD budget corresponds only to two to three percent of the U.S. defense budget, in absolute terms it remains a huge sum. It also says something about the magnitude of the U.S. defense budget, which is much more than the combined defense budgets of Russia, China, Iraq, Iran and North Korea.

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[44] David Gompert, "Alternative Concepts," in Burkard Schmitt and Julian Lindley-French, eds., *NMD and the future of nuclear policy*, Occasional Paper 18, Institute for Security Studies, Western European Union, September 2000, p.30. My emphasis.

[45] William Martel, "The end of non-proliferation," *Strategic Review ,* Fall 2000, p.20. My emphasis.

As of March 2002, the United States has spent some $ 120 bn on missile defense since the 1950s, $ 70 bn since President Reagan launched SDI in 1983.[46] The result, however, is that not one system works.

From a budgetary perspective, the analysis is relatively simple: the higher the option, the more expensive the system. Lower-tier TMD systems cost tens of billions of dollars. The first phase planned by the Clinton administration, C-1 (part of option two), would cost $ 20-30 bn. To calculate the cost for option two, one must add the expenses generated by a limited boost-phase system and THAAD, which would bring the total to $ 50-100 bn. Option three includes C-2 and C-3, which a Congressional Budget Office report of April 2000 estimated would cost $ 60 bn.[47] Realistically, the cost of option three would include Navy Theater Wide TMD systems and soar beyond $ 100 bn. Option four exceeds $ 240 bn according to a CSIS study.[48]

As these are current estimates, one can expect that real costs would be substantially higher. David Mosher (RAND) for instance stated at the end of 2000 that: "The estimated price tag for the NMD portion of GPALS was 42$ bn when it was first unveiled. Today, the capability-2 configuration of the NMD system is a mere shadow of the original GPALS system, with one-seventh the number of interceptors, two-thirds the number of ground-based radars, fewer than half the number of sbirs-low satellites, and none of the 1,000 space-based interceptors known as Brilliant Pebbles. Yet that small system is estimated by the Congressional Budget Office to cost more than

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[46] Xavier de Villepin, *Les enjeux de la défense nationale antimissile aux Etats-Unis* (Paris: Rapport du Sénat, Commission des Affaires Etrangères, de la défense et des forces armées, 2000), p.9.

[47] Including SBIRS-low satellites. See: Congressional Budget Office, *Budgetary and technical implications of the administration's plan for National Missile Defense*, April 2000, 28 p.

[48] William Hartung and Michelle Ciarocca, "Tangled web," May 2000, www.worldpolicy.org/projects/arms/reports/tangled.htm.

30$ bn."[49] A Congressional Budget Office (CBO) report of January 2002 found that the cost estimates for a ground-based missile defense system were already thirteen to twenty-six percent higher than an April 2000 CBO estimate.[50]

From a budgetary perspective, option one is the best choice, and option two the second best.

c) Strategic context and threat assessment in flux

Since September 2001, terrorism is the biggest threat to the United States. The perceived new threat that caused most concern in the United States immediately after the Cold War, however, was the spread of weapons of mass destruction, including nuclear, chemical, and biological weapons, as well as their means of delivery, such as ballistic and cruise missiles. Proliferation of weapons of mass destruction by anti-American states, such as Iran, Iraq, and North Korea (and others) was regarded as particularly threatening. The leaders of these countries did not always behave rationally in the eyes of the American leaders. For example, U.S. NATO analyst Gregory Schulte claimed: "It may be difficult to assess the personality and intentions of the leaders of proliferating states. We might even consider these leaders to be 'irrational', at least by our standards."[51] Unlike the leaders in the Kremlin during the Cold War, the leaders of Iraq, Iran and North Korea were perceived as being not (or less) susceptible to nuclear deterrence.

This new risk was taken even more seriously in August 1990 when Saddam Hussein, who had already ordered the use of weapons of mass destruction in the 1980s, invaded Kuwait.

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[49] David Mosher, "Understanding the extraordinary cost of missile defense," *Arms Control Today*, Vol.30, No.10 (December 2000).

[50] Matt Kelley, "Missile defense cost may increase," *Associated Press,* February 1, 2002.

[51] Gregory Schulte, "Responding to proliferation – NATO's role," *NATO's Review*, Vol.43, No.4 (July 1995), p.18.

Moreover, the Gulf War revealed that Iraq had a nuclear weapons program that was much more advanced than previously known to the outside world.

The threat assessment of the Clinton administration did not differ very much from the previous one. CIA Director James Woolsey (in the first Clinton administration) stated somewhat prosaic: "We have slain the [Soviet] dragon. But we now live in a jungle filled with a bewildering variety of poisonous snakes."[52]

This proliferation threat was and still is used to justify missile defense. To assess whether missile defense is the right answer to the aforementioned risks is an extremely complicated task. First one must ask, are these threats real? If they are not, perhaps advocates of missile defense use them to push their initiatives for other reasons - for instance, because of ideological, partisan or parochial (i.e. industrial) interests. If the threats do exist, this still does not prove that missile defense is the right response.

It is generally recognized, and rightly so, that the spread of weapons of mass destruction is destabilizing to international peace and security. Although some academics claim the opposite, their comments are made in connection with a specific region and/or with regard a specific type of weapon. Everyone agrees that a world in which more states possess chemical, biological, and/or nuclear weapons and the means to deliver them is a more dangerous one. It is also generally understood that there is an inherent risk driving the further spread of weapons of mass destruction because of the anarchical nature of the international political system. Also, it is not extremely difficult to build these weapons. Once a state starts building weapons of mass destruction, others may follow for different reasons. Some states might regard these weapons as instruments of prestige. A more common reason for acquiring this kind of technology is a feeling of insecurity as a result of the acquisition of weapons of mass destruction by others. This is a classic example of the security-

[52] Quoted by Janne Nolan, *An elusive consensus* (Washington, D.C.: Brookings Institution, 1999), p.2.

dilemma in international politics by which the overall security situation becomes worse despite acquiring more weapons, because an arms-race ensues.

Opinions differ, however, as to whether the danger related to the spread of weapons of mass destruction has become smaller or larger since the end of the Cold War. It is clear that the horizontal[53] proliferation of chemical, biological, and even nuclear weapons, and missiles has increased over the last decades. The enormous nuclear arsenals built up during the Cold War, on the other hand, are gradually dismantled. That said, there remain more or less 30,000 nuclear warheads in the world.

It is normal for strategists to give more attention to smaller, previously neglected threats or risks, after the big threat disappears. It would, however, be a mistake to put them on the same absolute level. The USSR had the capacity to destroy the United States completely several times. Only Russia can do so now and no other state will have this ability in the foreseeable future. Consequently, there is a difference in magnitude with regard to the current threat in comparison with the former one. In terms of potential destructive capacity, the former threat was much larger[54].

Moreover, the discrepancy between the perception of the proliferation threat during the Cold War and after it is significant. How was the risk of proliferation perceived, for example, in the seventies, or at the beginning of the eighties? What about the international community's (including the United States) reaction vis-à-vis the use of chemical weapons by Iraq against Iran and its own Kurdish population in the eighties?

The most relevant question, however, is if the probability that the United States will be significantly hurt by weapons of mass destruction now or in the immediate future has risen or not. It

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[53] A distinction should be made between horizontal and vertical proliferation, the former being the spread of weapons to more and more countries, while the latter signifies advances in capability inside one specific country.

[54] The Cuban missile crisis shows that it was not just a theoretical threat either.

is too easy to claim that the former nuclear threat has vanished, because a distinction should be made between authorized use and unauthorized or accidental use (or authorized use after a false alarm). While the risk of authorized use is more or less non-existent, the other risks have, according to many experts, *increased* because of the deteriorating state of the Russian nuclear arsenal.[55] In addition, nuclear capabilities of states like Iraq, Iran and North Korea have increased the threat. Because the advocates of missile defense mainly focus on the latter, the following re-assessment is also limited to the threat posed by these "states of concern".

Threat re-assessment

A distinction should be made between the means to carry out an attack and the intentions of the enemy. The British and French nuclear weapons, for example, do not pose a threat to the United States because these states do not cultivate hostile intentions toward it.

1) Means

Short-range ballistic missiles and cruise missiles are the only kind of missiles that currently exist in great numbers, and they are spread around more than thirty countries. NMD cannot protect the United States against them. They may threaten U.S. troops abroad, however, as during the Gulf War when dozens of American soldiers died as a result of an Iraqi Scud missile attack. In addition,

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[55] The first comprehensive volume on this subject is: Kurt Campbell, Ashton Carter, Steven Miller and Charles Zraket, "Soviet Nuclear Fission. Control of the Nuclear Arsenal in a Disintegrating Soviet Union," *CSIA Studies in International Security*, No.1 (November 1991). Others are: Graham Allison, Owen Coté, Richard Falkenrath, and Steven Miller, *Cooperative denuclearization* (Cambridge, Mass.: CSIA, 1993); Graham Allison, Ashton Carter, Steven Miller and Philip Zelikow, *Avoiding nuclear anarchy* (Cambridge, Mass.: MIT Press, 1996); Matthew Bunn, *The next wave; urgently needed new steps to control warheads and nuclear material* (Washington, D.C. and Cambridge, Mass.: Carnegie Endowment for International Peace and Managing the Atom Project BCSIA, 2000).

some of these missiles are, or can be, capable of threatening the territory of U.S. allies like Europe, Israel, South Korea, and Taiwan. Logically, it can be concluded that the deployment of lower-tier missile defense systems is the most urgent task for the United States and its allies.

Except for Russia and China, no state currently has the capability to reach U.S. territory with intercontinental missiles, and this is unlikely to change in the near future either. As BCSIA fellow and former Georgetown instructor Dinshaw Mistry stated in March 2000: "Developing countries mainly have 700 – to 1,200 mile range missiles that cannot reach the continental US. Their longer-range rockets, North Korea's 3,700-mile range Taepodong-2 and Iran's 1,500–mile range Shebab-4 – both of which could be tested within a year – also generally fall short of US territory. (The closest major American city, Boston, is 5,800 miles from Iran, 5,500 miles from Iraq, and 4,400 miles from Libya, while North Korea is 3,500 to 4,000 miles from Alaska, 4,400 miles from Hawaii and 4,800 miles from Seattle.)"[56]

While it is possible, and maybe even likely, that some states will be capable of producing or acquiring long-range missiles in the future, it is unclear when that will be the case. It is unlikely that they will be able to mount a small nuclear warhead on top of it, either. Chemical and biological warheads for ICBMs, in contrast, are easier to produce. Chemical weapons, however, are not very significant from a military point of view, because their efficiency depends on the weather and the specific environment; they may be useful, however, as a psychological terror weapon. Biological weapons also suffer from major disadvantages: slower speed of destruction; the risk of self-contamination; less predictability. It is therefore doubtful that regimes that want to attack the United States will use one of their few intercontinental missiles with a non-nuclear warhead.

Finally, and more fundamentally, states that want to hurt the United States in an asymmetric way could make American life difficult with a range of non-ballistic means of delivery. It would, for

[56] Dinshaw Mistry, "A cooperative approach to missile defense," *San Diego Union Tribune*, March 10, 2000.

instance, be much easier to hit the United States with a rudimentary atomic bomb hidden in a truck or delivered by plane or ship than with a missile. Robert Walpole, national intelligence officer for strategic and nuclear programs, predicted in testimony before Congress in February 2000: "We project that in the coming years, US territory is probably more likely to be attacked with weapons of mass destruction (most likely from non-state entities) than by missiles."[57] This assessment has for the first time been confirmed by an unclassified National Intelligence Estimate (NIE) in January 2002[58]. The terrorist attacks of September 2001 showed that one does not even need weapons of mass destruction to produce large-scale damage. Of course, this is not a convincing argument against NMD, but it puts NMD into perspective. While NMD may diminish the subjective feeling of insecurity in the United States, it might not fundamentally affect its objective security situation. In case NMD does not function properly, the odds are that NMD will *decrease* U.S. security (see further).

2) Intentions

Do states like Iraq, Iran and North Korea intend to attack the United States with weapons of mass destruction? A distinction should be made between states that want to attack U.S. territory for revenge or ideological reasons, and states that threaten to use such weapons to prevent U.S. interventions on or near their territory. With regard to the former, it is likely that the United States will react with military means. As a result, these regimes may think twice about attacking the United States, at least if they are susceptible to deterrence. In practice, no such attack has ever occurred. There are no indications that even the so-called "states of concern" do act irrationally and therefore

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[57] Robert Walpole in Senate Subcommittee on International Security, Proliferation, and Federal Services, testimony, February 9, 2000, quoted by Andrew Sessler, ed., *Countermeasures*, p.12.

[58] Walter Pincus, "U.S. alters estimate of threats," *Washington Post*, January 11, 2002, p.A1.

would not be susceptible to deterrence. By "rational" it is only meant that, before taking decisions, one makes a kind of cost-benefit analysis based on an internally consistent value system that is not intrinsically different from the one used in the West. Irrational leaders in contrast would value core concepts, such as life and death, different to those used in the Western world. For ideological or religious reasons, some people might, for instance, believe that by using (large-scale) violence they would be rewarded in some way or another, although not in this world. This was exactly the attitude of the ones carrying out the terrorist attacks in September 2001. But are there indications that the current leaders in Baghdad, Teheran and Pyongyang behave in this way?

Two further points need to be made. First, even regimes that behave rationally can miscalculate, as Saddam Hussein did in 1990. However, there remains a big difference between attacking and invading a small neighboring state without a meaningful defense, and launching an intercontinental missile with weapons of mass destruction against the most powerful state in the world, especially when that state possesses precision-guided munitions capable of attacking anywhere in a very accurate way.

Second, while the world has (probably) not as yet encountered leaders with an "irrational" mindset who at the same time possess weapons of mass destruction, it is not unreasonable to suggest that such leaders may appear one day. Kamikaze attacks with conventional munitions by Muslim-fundamentalists in the Middle East are examples at the lower end of the scale of violence. The chemical gas attack by the Aum Shinrikyo sect in the Tokyo metro in 1995, when twelve people died and more than 5,000 were wounded, is closer to the worst-case scenarios envisaged. What if a Taliban-like regime succeeded in getting nuclear weapons based on intercontinental ballistic missiles? Advocates of missile defense use this as an argument in favor of NMD. However, the question that should be answered first is whether not everything should be done to prevent that this kind of

technology falls in the hands of those people, and secondly whether NMD enhances or diminishes the risk that such worst-case scenarios will become real (see further).

Beside out-of-the-blue attacks with weapons of mass destruction, there is the more likely threat that such weapons are used, at least as a deterrent, by states like Iraq, Iran or North Korea in the event that the United States intervenes in their region. Here, the question is whether the United States should have the ambition to intervene where and when it wants without the risk of being attacked. Asking this question is certainly no plea for stimulating proliferation. The purpose of NMD cannot be to make the United States completely invulnerable in addition to its already dominating position in the offensive field. Such a situation would be intolerable for other states and is therefore untenable even in the short term. In other words, complete (perceived) U.S. invulnerability combined with hegemonic behavior will certainly provoke violent reactions against the United States. Philip Stevens in the *Financial Times* accurately predicted in April 2000: "The Pax America has many enemies…. America's very power makes it the target for rogue states and terrorists…. This threat is as real to Americans as it seems remote to most Europeans."[59]

More fundamentally, which states are "rogue states"? What is its definition, who determines the criteria and who finally judges about it? The fact that the European states - despite their proximity to the Middle East - never used the term "rogue states" may indicate that the term is used for other (read domestic) purposes. Europe has better relations with Iraq, Iran and North Korea than the United States. Most European states, for instance, have continued doing business with Iran in recent years. For the same purposes, they also started flying to Baghdad, despite United Nations resolutions imposed by the United States. Many of them have also opened embassies in North Korea at the end of 2000.

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[59] Philip Stevens, "American umbrella against the world," *Financial Times*, April 14, 2000.

3) Iran, Iraq and North Korea

The most pressing threat with regard to weapons of mass destruction combined with long-range missiles probably comes from *North Korea*, which is estimated to have a Taepo Dong long-range missile that can reach parts of Alaska by 2005, though others disagree. Experts such as Michael O'Hanlon, Charles Glaser, and Steve Fetter remain skeptical: "The technical challenges to making the Taepo Dong 2 work, and to building a small enough nuclear warhead to fly atop it, are significant."[60] Until late 1999, the U.S. intelligence community did not believe in an immediate or medium-term threat (ten to fifteen years) from North Korea. The Rumsfeld Commission in 1998, in contrast, remarked that "the threat to the US [posed by these emerging (missile) technologies] is broader, more mature and evolving more rapidly than has been reported in estimates and reports by the intelligence community."[61] It was only after that report became public and after the North Korean launch of a Taepo Dong 1 missile over the territory of Japan in the summer of 1998 that the CIA estimates changed. The new intelligence assessment is also based on new, less demanding, criteria.

Despite this missile launch, there are many indications that North Korea acts rationally, and regards its weapons of mass destruction program more as a bargaining tool than a military instrument. The Agreed Framework between the United States and North Korea of 1994 that essentially froze the North Korean fissile material program was the first indication in this regard. In the meantime, North Korea also declared a missile test moratorium in September 1999 that was extended in May 2001 until 2003 provided that the negotiations with the United States proceed. An undeniable political break-through took place in Korea in the summer of 2000 culminating in a

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[60] Michael O'Hanlon, "US missile defense programs"; see also: Charles Glaser and Steve Fetter, "National Missile Defense and the future of US nuclear weapons policy," *International Security,* Vol.26, No.1 (Summer 2000), p.47.

[61] Quoted in: *Disarmament Diplomacy*, No.28, July 1998, p.51.

meeting between the two presidents, for which the South Korean president was awarded the Nobel Peace Prize. North Korea also froze its missile program in October 2000.

These measures, however, may be reversed if talks with the United States slow down. The Bush administration first refused to talk to North Korea. When it changed its position, it was North Korea that blocked further talks. President Bush's State of the Union speech of January 2002, in which he described North Korea together with Iran and Iraq as the "Axis of Evil", will not move the relationship forward either.

Iraq's far-reaching nuclear weapons and ballistic missile program was destroyed by the Gulf War. As mentioned, Iraq has showed that it is not afraid to use such weapons. While the knowledge still exists and some hardware may remain undetected, it will take many years to build up the former program, let alone an intercontinental ballistic missile able to carry a nuclear warhead.[62] Moreover, with such a bad track record, it is difficult to imagine how the international community will not detect and halt Iraq's weapons programs in the future. Finally, some say that the physical condition of Saddam Hussein is deteriorating, which might shorten the lifetime of the regime as well. In the wake of the terrorist attacks of September 2001, Iraq may be another target for the United States after it ceases the campaign in Afghanistan.

Iran is also considered to be part of the "Axis of Evil", according to President Bush. For Europe, this claim sounds not very credible, as Iran has a democratic tradition, even if ayatollahs remain powerful. Moderates seem to win the political battle against fundamentalists. The terrorist attacks made that even the United States looked for possible cooperation with Iran. Unlike Iraq and North Korea, Iran has never been accused by the IAEA of not keeping its Nuclear Non-

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[62] Some, however, maintain that Iraq acquired a few nuclear warheads since the Gulf War. U.Mahnaimi and T.Walker, "Defectors say Iraq tested nuclear bomb," *London Sunday Times*, February 25, 2001.

Proliferation Treaty (NPT) obligations. Iran has tested the Shahab-3 (1,300 km) and is planning to test the Shabab-5 (5.500 km) between 2005 and 2008.[63] Neither missile can reach the United States.

4) Conclusion

The spread of weapons of mass destruction is steadily growing. However, the United States will probably be safe from long-range missiles with nuclear weapons for at least another decade and probably much longer. In the best-case scenario, which is not unrealistic, some of these regimes - more in particular the ones in Iraq and North Korea - will simply collapse. The likelihood then increases that their weapons programs will be completely halted, as was the case in South Africa[64]. But even if these weapon programs and regimes continue to exist, military means do not automatically pose a threat, except if one assumes worst-case intentions, which may become a self-fulfilling prophecy. Calling some countries "rogue states," is not a confidence building measure, to say the least.

To conclude, lower-tier TMD systems will remain sufficient for another decade. In the very unlikely case that one state obtains ICBM technology, the number of missiles will be very limited, which means that a limited NMD system able to destroy five to ten (or at most twenty) ballistic missiles is more than enough (option two).

d) Is NMD a viable solution from a strategic stability point of view?

If missile defense is a solution, it is not a pro-active one. It does not only fail to take away the underlying causes of proliferation, it does not affect the existence of the offensive missiles either.

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[63] Xavier de Villepin, "Les enjeux de la défense nationale antimissile aux Etats-Unis", p.24.

[64] South Africa produced nuclear weapons in the '80s but destroyed them in 1990.

NMD would be the perfect solution, if it were 100 percent missile-proof. There are currently few scientists not directly connected to the U.S. government who believe the existing technology is infallible (see before). Moreover, there is still a big difference between a high degree of infallibility and protecting whole nations against a nuclear missile attack, even if they are limited to the largest cities. If only one missile with a nuclear warhead glides through the defense system, hundreds of thousands of people may be killed.

Advocates of NMD such as President Bush and Secretary of Defense Donald Rumsfeld admit that a system that is 100 percent safe does not and will probably never exist, but claim that "something" is better than "nothing". One reason why this may be wrong is that the logic that legitimizes NMD - a solution for threats from states like Iraq, Iran or North Korea - is basically flawed. Here a distinction should be made: either these states or their leaders are "rational" and therefore susceptible to deterrence, or they are not.

Undeterable leaders who want to hurt the United States, are still going to launch their missiles even if they know the American NMD system is in theory "highly capable" of defending the United States. It is natural for risk-takers to challenge the system. NMD does not affect the deterrence calculation of those risk-takers, it may even have the opposite effect. It may be rational for Americans to worry about the existence of such people. It is, however, not rational for a democratically-elected government to keep a defense policy that relies on nuclear deterrence coupled with an "effective" missile defense system that has never been tested in real time to deter such people from attacking and killing potentially hundreds of thousands of people.

And why would the current nuclear (or even conventional) deterrent of the United States not deter "rational" leaders (including probably Saddam Hussein, Ali-Hoseine Khamenei and Kim Chong-il)?

This distinction apparently seems to be absent in Washington at the moment, at least publicly. For example, Rumsfeld stated during his confirmation hearing: "Nuclear deterrence remains an essential element of our defense policy…. But it must be adapted to 21st century needs. Credible deterrence no longer can be based solely on the prospect of punishment through massive retaliation. Instead, it must be based on a combination of offensive nuclear and non-nuclear defensive capabilities working together to deny potential adversaries the opportunity and benefits from the threat or use of weapons of mass destruction against our forces and homeland, as well as those of our allies."[65] Or, as former Clinton DOD appointee Jan Lodal wrote: "An NMD system raises the stakes for a potential attacker, thereby *enhancing* deterrence and giving the US greater leeway."[66] Stephen Cambone, a Bush administration appointee, puts it like this: "The higher the probability of its successful employment the lower the credibility *in American minds* of an adversary's threat to launch an NBC-armed ballistic missile attack against US territory."[67]

Again, the basic problem with this approach is twofold: against undeterable regimes, this deterrence logic simply does not work, and to base one's defense on such a policy is simply too risky. And even if NMD slightly enhances the already immense deterrence threshold for regimes that are susceptible to deterrence, the question is whether the whole project is worth it, especially looking at its side-effects (see further).

A more subtle problem is that the deterrent (in contrast to the defensive) function of NMD partly legitimizes the fact that the system should not work perfectly. Bruno Tertrais, for instance,

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[65] Donald Rumsfeld, U.S. Senate, Confirmation Hearing, January 11, 2001. My emphasis.

[66] Jan Lodal, "Pledging 'no first strike': a step toward real weapons of mass destruction cooperation," *Arms Control Today*, Vol. 31, No.2 (March 2001). My emphasis.

[67] Stephen Cambone, "Threats and risks prompting a commitment to BMD", in Burkard Schmitt and Julian Lindley-French, eds., *NMD and the future of nuclear policy*, p.13. My emphasis.

pointed out: "Such defenses should not be seen as an alternative to nuclear deterrence, but rather as an additional insurance policy or a 'second line of defense'…. Whether strategic defenses will satisfy the requirements of the US government's program, [NMD is conceived] as much as a deterrent as an operational program."[68] But taking into account the aforementioned statements of U.S. officials about irrational regimes, building a system that only satisfies the "requirements" and does not work, does not make sense from a policy-maker point of view because of the extremely high costs in the event the system does *not* work. McGeorge Bundy said during the Cold War: "There is an enormous gulf between what political leaders think about nuclear weapons and what is assumed strategic warfare. Think-tank analysts can set levels of 'acceptable' damage well up in the tens of millions of lives. They can assume that the loss of dozens of great cities is somehow a real choice for sane men. They are in an unreal world. In the real world of political leaders – whether here or in the Soviet Union – a decision that would bring even one hydrogen bomb on one city of one's own country would be recognized in advance as a catastrophic blunder; ten bombs on ten cities would be a disaster beyond history."[69]

The question then becomes whether the possible, but unlikely and uncertain, additional protection provided by NMD counterbalances the possible negative side effects of NMD. This is a second reason why people like President Bush and Rumsfeld may be wrong in stating that even a system that is not 100 percent safe is better than nothing. In this context only the possible negative effects on proliferation are further analyzed, because proliferation is the main justification for missile defense.

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[68] Bruno Tertrais, "US missile defense. Strategically sound, politically questionable,"*Centre for European Reform Working Paper*, April 2001, p.16. My emphasis.

[69] McGeorge Bundy, "To cap the vulcano," *Foreign Affairs*, Vol.48, No.1 (October 1969), p.10.

There are five indications that proliferation might significantly *worsen* as a result of building NMD[70]. First, states and non-state actors that currently do not have missiles will certainly notice how one can scare the most powerful nation in the world. Commander D.MacDonald of the Royal Navy wrote: "The billions of dollars being spent on [Tactical Ballistic Missile Defense] research and development may lead potential adversaries to draw the conclusion that a few casualties can have a disproportionate significance."[71] NMD might therefore stimulate proliferation.

Second, NMD may complicate specific *diplomatic* initiatives to manage proliferation. Putting boost-phase systems near a proliferator is hardly a confidence building measure. This may deteriorate relations with countries like Iran and North Korea instead of improving them.

Third, building missile defense may undermine existing nuclear *deterrence* policy, which on its turn could stimulate other states to acquire weapons of mass destruction. By deploying NMD, the United States admits that the current framework (including deterrence) is not sufficient. But why keep two inefficient instruments that provide constant incentives, increase the original danger and even together are not up to their task?

A radical alternative is a ban on ballistic missiles for military purposes, which in the end might be more effective than missile defense and more feasible from a technical point of view. Alton Frye wrote in 1996: "In terms of technical feasibility and reliability, a prohibition on the testing, production, and deployment of ballistic missiles is incomparably simpler than an active defense against them."[72] Interestingly, even Ronald Reagan considered this concept. Combined with a ban on chemical (Chemical Weapons Convention, 1993), biological (Biological Weapons Convention,

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[70] See also James Moltz, "The impact of NMD on nonproliferation regimes," *Nonproliferation Review*, Vol.7, No.3 (Fall/Winter 2000), pp.61-74.

[71] D.MacDonald, "TBMD could backfire," *Proceedings*, April 1998, p.81.

[72] Alton Frye, "Banning ballistic missiles," *Foreign Affairs*, Vol. 75, No.6 (November/December 1996).

1972), and nuclear weapons (as foreseen in Article 6 of the NPT), a ban on ballistic missiles for military purposes stands as a realistic alternative to missile defense. Politically, however, this idea does not seem feasible in the foreseeable future.

Fourth, *sharing* missile defense with the U.S. allies and possibly Russia to overcome their resistance against NMD will lead to the exportation of missile technology and could, therefore, be seen as a stimulus for missile proliferation as this kind of defensive technology may also be used for offensive purposes. It is therefore not by chance that this was prohibited by Article 9 of the ABM Treaty, as well as the Missile Technology Control Regime (MTCR) guidelines.

The biggest problem, however, is that if the United States begins sharing its technology, other states may do so too. States like China (or even Russia) may not only export defensive technology or counter-NMD technology that can easily circumvent mid-course NMD systems, but may also help states like Iraq, Iran or North Korea acquire offensive missiles and weapons of mass destruction. This would be extremely dangerous and would also mean the end of the existing nonproliferation regime.[73]

Fifth and must fundamentally, deploying NMD might undermine national and international instruments aimed at *preventing* or containing proliferation. Bureaucratically speaking, there will be new departments in the U.S. administration (such as the Ballistic Missile Defense Organization that is called Missile Defense Agency since January 2002) fighting for budgets and influence, most likely at the cost of classic nonproliferation bureaucracies. These nonproliferation desks may in the worst-case case gradually disappear, as happened with their more ambitious colleagues that dealt with arms control and disarmament. The Arms Control and Disarmament Agency (ACDA) established by

[73] An international regime can be defined as a constellation of principles, rules, procedures, norms, and laws, voluntarily agreed upon by states in a specific domain, that aim to provide a solution to a specific problem that is perceived as such by more than one international (state) actor.

President Kennedy was abolished by the Republican-dominated Congress in the nineties. The existing international nonproliferation regime, which is generally recognized as the major obstacle against proliferation, however, is even more threatened by NMD on the international level. The nonproliferation regime consists of international legally binding treaties such as the Nuclear Non-Proliferation Treaty (NPT) of 1968, the Anti-Ballistic Missile (ABM) Treaty, the Comprehensive Test Ban Treaty (CTBT), the Chemical Weapons Convention, and different Nuclear-Weapon-Free-Zone treaties; international organizations like the United Nations, the Conference on Disarmament (CD) in Geneva, the International Atomic Energy Agency (IAEA) in Vienna, the Organization for the Prohibition of Chemical Weapons at The Hague, the CTBT Organization in Vienna; not legally binding export-control regimes such as the Missile Technology Control Regime (MTCR)[74], the Nuclear Suppliers Group, and the Australia Group; and unilateral declarations like the positive and negative security guarantees given by the Nuclear Weapon States to the Non-Nuclear Weapon States.[75] The basic purpose of the nonproliferation regime is to make life more difficult for those interested in buying or producing weapons of mass destruction.

The success rate of the nonproliferation regime can be questioned, but it is generally recognized that the regime succeeded in making it much more difficult to acquire weapons of mass destruction. States that are willing to spend a lot of time and money on acquiring those weapons, however, will sooner or later probably succeed in their endeavors.

The key question now is whether the existing nonproliferation regime will unravel in the near future, or whether it can be managed. Opinions differ substantially. Advocates of NMD have

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[74] Seventy-eight states agreed in Paris in February 2002 in the framework of the MTCR to supplement the MTCR guidelines in the future with a not legally binding International Code of Conduct. Luc de Barochez, "Désaccord transatlantique face à la menace des missiles," *Le Figaro*, February 7, 2002.

[75] This is a non-exhaustive list.

apparently given up hope of maintaining the existing nonproliferation regime. They claim that the Iraqi and North Korean cases show that Non-Nuclear Weapons States do not always keep their legally binding obligations.

But as the French Political Director Gerard Errera pointed out: "By pursuing a NMD, how do you avoid giving the impression that you have given up on the fight against proliferation, especially at a time when there are, domestically, other expressions of a certain skepticism toward multilateral agreements in this field?"[76] From the point of view of the 183 states that signed the NPT, promising not to acquire nuclear weapons, to combine nuclear deterrence and missile defense, as the United States is planning to do, violates the spirit of the treaty. In the short term, the Nuclear Weapon States will feel more invulnerable with missile defense added to their nuclear arsenals. In the long term, the elimination of nuclear weapons – an "unequivocal" goal since the 2000 NPT Review Conference – might be even more difficult to realize. It is, therefore, not surprising that most states still regard the ABM Treaty as a crucial factor for strategic stability. At the 2000 NPT Review Conference, South Africa explicitly called the idea of amending the ABM Treaty a betrayal of what was promised at the 1995 NPT Review and Extension Conference. At the United Nations First Committee in November 2001, every country except the United States, Israel, and Micronesia, voted for strict compliance with the ABM Treaty. It remains to be seen what the effects of the withdrawal from the ABM Treaty will be at the NPT Review Conference in 2005. Following the logic of the opponents of the ABM Treaty, the world has changed and Mutual Assured Destruction (MAD) is of no value anymore. However, if this is so, what is the residual role of nuclear weapons? And if the overall result of NMD is *more* proliferation as a result of a possible break-up of the existing nonproliferation regime, what is the remaining value of NMD?

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[76] Gerard Errera, remarks at Carnegie Endowment Conference on the March 17, 2000, *Carnegie Proliferation Brief*, Vol.3, No.9 (April 4, 2000).

Most NMD advocates do not want to do away with the existing nonproliferation regime. They just want to add "hard-core" instruments like missile defense to the regime. The basic problem with this approach is that the United States is not the only state actor in the world, and that if it decides to withdraw from the ABM Treaty, as it did in December 2001, other states may take similar measures. As Errera states, those who judge "the ABM Treaty to be outdated and irrelevant…must also be prepared to hear some countries apply the same logic to all of international law, including, in the first place, the NPT."[77] The NPT, however, is regarded as the cornerstone of the nonproliferation regime. As a result, "multilateralism à la carte" in international politics - as Richard Haass, the Policy Planning Director in the State Department, calls it - is not tenable in the long-term, because of the inherent characteristics of an international regime. Regimes by definition cannot survive if states start withdrawing from key parts of it, unless most other actors agree. The two most important states in this regard are Russia and China.

Russia

The Bush administration argues that the ABM Treaty is a Cold War relic and not relevant anymore. According to the U.S. government, NMD is not supposed to protect the United States against a deliberate Russian attack. NMD would not be capable of doing so because of the current size of the Russian nuclear weapons arsenal. While this is true, the Russian nuclear arsenal is in poor condition and may deteriorate rather quickly in the near future. Russia has the financial means to maintain an operational arsenal of no more than 1,500 strategic warheads, unless it discards the START II rules and MIRV's its ICBMs. Only 100 to 200 of the Russian warheads are really survivable at any moment. Taking into account other military criteria, such as the quality of nuclear

[77] Quoted by John Steinbruner, "The strategic impact of NMD," in Joseph Cirincione, ed., *White paper on NMD*, (Washington, D.C.: Lawyers Alliance for World Security, Spring 2000), p.38.

weapons, the quality of command and control systems (including early-warning satellites), the quantity and quality of modern conventional weapons, and the overall technology gap between Russia and the United States, Russians planners may start to worry about the remaining deterrence effect of its eroding nuclear arsenal. If the United States builds a rather extensive NMD system with hundreds or thousands of interceptors (either option three or four), it is not difficult to understand the reaction of the Russian military. Jack Mendelsohn explains the underlying fear: "What Russian officials are most concerned about is the creation by the US 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 US with a 'base' for a territorial defense from which it could 'break-out.'"[78] John Steinbruner agrees: "No nation that might find itself in confrontation with the US can afford to assume that the US will adhere indefinitely to NMD limitations that virtually preclude any meaningful capability."[79] He also said: "the sensing systems and information handling capacity associated with the projected NMD system, combined with the USSPACECOM program, would meaningfully enhance the preemptive potential of US offensive forces, both nuclear *and conventional*…. Russia would have reason for concern once a second site is added covering the eastern US."[80]

The official Russian reaction after the United States announced its withdrawal from the ABM Treaty in December 2001 was rather muted[81]. President Vladimir Putin said that it was a mistake but that the overall American-Russian relations would not be hurt. It corresponds to Putin's

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[78] Jack Mendelsohn, "The impact of NMD on the ABM Treaty," in Joseph Cirincione, ed., *White paper on NMD*, p.31.

[79] John Steinbruner, "The strategic impact of NMD," p.33.

[80] John Steinbruner, "The strategic impact of NMD," p.34. My emphasis. He implicitly refers to Pentagon documents such as Joint Vision 2010.

cooperative behavior after the September 11 terrorist attacks and the subsequent war in Afghanistan. Certainly, this move was rewarded with economic considerations and a bigger say in the Atlantic Alliance. The muted reaction contrasts with what Putin and other high level Russian officials had said before. Putin, for instance, speaking in April 2000 about a possible U.S. withdrawal from the ABM Treaty, said: "I want to stress that…[we] 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."[82]

Although it is unclear what the further Russian reaction will be in the immediate future, it is doubtful that Putin will execute what he threatened to do in April 2000. Putin even announced a further decrease in the number of operational strategic nuclear weapons after the United States announced its unilateral withdrawal of the ABM Treaty. This opens the way for a formal bilateral agreement about nuclear reductions, following the unilateral declarations of the United States and Russia in November 2001 to diminish the numbers to 1,750-2,250 in 2012. Bilateral talks started in January 2002 and Secretary of State Colin Powell hoped that an agreement would be ready before the next summit in June 2002.

Six remarks however have to be made in this regard: First, the outcome of the agreement Powell is referring to is still unclear. The Russians may try to discuss defensive systems and try to negotiate a new kind of ABM Treaty because Russia cannot take for granted the current smooth

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[81] For an explanation, see Celeste Wallander, "Russia's strategic priorities," *Arms Control Today*, Vol.32, No.1 (January/February 2002).

[82] Quoted by John Steinbruner, "The strategic impact of NMD," p.35.

relations between the United States and Russia.[83] Former Defense Minister Igor Sergeyev, currently Putin's military adviser, stated in February 2002 that the United States should put restrictions on its missile defense system.[84] First Deputy chief of staff Col.Gen. Yuri Baluyevsky asked two weeks earlier negotiated missile defense limits.[85]

Second, START II is dead and Russia may therefore keep deploying destabilizing MIRV'ed missiles.[86] It will also be obliged to keep its nuclear weapons on alert. High alerts equals high risk of accidents, which is exactly the opposite of what NMD is supposed to prevent. Indeed, some regard NMD as a defense against the risk of accidents coming from the deteriorating Russian nuclear weapons arsenal. There are however much easier steps than missile defense to alleviate this risk of accidents, such as downsizing the Russian nuclear arsenal fundamentally and removing warheads from delivery vehicles (de-alerting).[87] Paradoxically, it was the United States that recommended in secret talks with the Russians in January 2000 to keep at least 1,500 missiles "over the next decade and thereafter" and on high alert in order to be able to circumvent NMD.[88]

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[83] Joseph Cirincione and Jon Wolfsthal, "What if the new strategic framework goes bad?" *Arms Control Today*, Vol.31, No.9 (November 2001).

[84] Vladimir Isachenkov, "Moscow to upgrade its ABM shield," *Moscow Times*, February 11, 2002.

[85] Vladimir Isachenkov, "Russia hopes to limit U.S. shield," *Associated Press*, January 21, 2002.

[86] Wilkening claims that the new MIRV'ed missiles would be mobile and therefore much less destabilizing. Dean Wilkening, "Amending the ABM treaty," *Survival*, Vol.42, No.1 (Spring 2000), p.30, 39. This argument only partially holds because a) it remains to be seen whether Russia will have the money to keep the ICBMs mobile; and b) arming ICBMs with different warheads more than a decade after the Cold War gives a wrong signal to the rest of the world from an arms control point of view.

[87] For de-alerting, see Bruce Blair, Harold Feiveson, and Frank von Hippel, "Taking nuclear weapons off hair-trigger alert," *Scientific American*, Vol.277, No.5 (November 1997).

[88] Stephen Schwartz, "The folly of US nuclear diplomacy," *Newsday*, May 7, 2000, p.B5; William Broad, "US-Russian talks revive old debates on nuclear warnings," *New York Times*, May 1, 2000.

Third, the proposed number of nuclear weapons is still very high. Nearly 4,000 deployed strategic nuclear weapons (in total) in 2012 is still in the realm of overkill and is absurd in the absence of a major enemy. Taking also into account thousands of sub-strategic nuclear weapons and thousands of strategic reserve warheads and bombs, it is clear that no fundamental shift took place in the nuclear weapons policy of both Cold War superpowers.

Fourth, Russia went along rather easily with the American decision to withdraw from the ABM Treaty, also because no NMD system has been deployed yet. It is for instance extremely doubtful whether Russia will agree with the deployment of a large-scale NMD system, with thousands of interceptors, able to threaten its own nuclear deterrent with only 100 to 200 survivable warheads.[89] If the United States chooses option three or four, the worst-case is that Russia withdraws from START I and START II, as well as INF, suspends the Cooperative (Nunn-Lugar) Threat Reduction Program, and begins actively helping proliferators.

Fifth, the U.S. decision certainly did not make life easier for Putin domestically. Different constituencies inside the Russian defense complex - the military and the intelligence community in particular - did not like the American decision. The same applies to many of Russian members of parliament. One month after President Bush' decision, the Duma condemned - 326 to 3 - the American withdrawal stating it was "mistaken and destabilizing since it effectively ruins the existing highly efficient system of ensuring strategic stability and paves ground for a new round of the arms race."[90] The American decision did not strengthen political stability in Russia, to say the least.

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[89] For a similar assessment - making a distinction between C-1 on the one hand and C-2 and C-3 on the other hand - see: Dean Wilkening, "Ballistic-missile defense and strategic stability," *Adelphi Paper,* No. 334 (2000), p.33.

[90] Vladimir Isachenkov, "Russia assails U.S. over ABM Treaty," *Associated Press*, January 16, 2002.

Sixth, while the idea behind a shared missile defense is in principle an excellent one[91], its implementation is very unlikely. In practice, it is difficult to see such level of cooperation as a feasible option given the nature of the current relationship between the United States and Russia in particular. As Harald Müller puts it: "It would require the US to share and transfer cutting-edge technology with countries its military elite still regards as rivals and potential enemies….Over the last years, the American inclination to transfer sensitive technologies has diminished rather than grown, even within the Western alliance."[92] The Defense Department has never been in favor of this option.[93] Remarks by Rumsfeld about Russia being "an active proliferator" do not suggest a change of mind.[94] Even National Security Adviser Condoleezza Rice, a Russia specialist, has serious doubts. She wrote: "Moscow should understand that any possibilities for sharing technology or information in these areas would depend heavily on its record – problematic to date – on the proliferation of ballistic-missile and other technologies related to weapons of mass destruction. It would be foolish in the extreme to share defenses with Moscow if it either leaks or deliberately transfers weapons technologies to the very states against which America is defending."[95] If sharing technology with Russia is considered extremely unlikely, it is even more so with China.

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[91] Advocates are for instance John Steinbruner, "NMD: Collision in progress," *Arms Control Today*, Vol.29, No.7 (November 1999), p.6; Carla Robbins, "Traditional arms talks with Russia may not work anymore, group says,"*The Wall Street Journal*, May 18, 2000; Max Kampelman and Frederick Seitz, Missile Defense: a global approach," *Washington Post*, April 8, 2001.

[92] Harald Müller, "Nearly mortal dilemma: The Europeans and the US plans for NMD," *Nuclear Control* (Yaderni Kontrol), Vol.6, Winter 2001, p.17.

[93] Andrea Stone, "Idea: share shield technology with Russia Senators say don't rule it out if it enables missile defense, but Pentagon unenthusiastic," *USA Today*, February 7, 2000.

[94] Jim Lehrer, interview with Secretary of Defense Donald Rumsfeld on Newshour, February 14, 2001.

[95] Condoleezza Rice, "Exercising power without arrogance," *The Chicago Tribune*, December 31, 2000.

China

What will China's reaction be to the U.S. withdrawal from the ABM Treaty? Although China in principle is not a stakeholder as the ABM treaty is a bilateral treaty between the United States and Russia, it is clear that China is directly involved. Up until now, the Chinese reaction has been rather muted. This stands in contrast to the negative signals China has sent in the past, when it was even more outspoken against NMD than Russia.[96] The reason why its reaction has been rather muted has certainly to do with the overall United States-Chinese relations which have been recently improved after China was granted the Olympic Games for 2008 and, more fundamentally, after China became member of the WTO a couple of days before the U.S. decision to withdraw from the ABM Treaty. China also cooperated with the United States after the September 11th terrorist attacks. Both China and the United States have economically much to lose with a Cold War like relationship.

But the odds are that the current honeymoon between the United States and China will not last. Many in the United States fear China as a strategic competitor in the coming decades. With a population four and a half times bigger and a continued economic growth rate that is at least twice as large as the United States, China may indeed become the strongest economic power in the world in 2020-2030. Some explicitly claim that NMD is basically meant to contain China.[97]

Tensions between the United States and China already exist. The Cox report in 1998 and the corresponding nuclear spy scandal, the bombing of the Chinese embassy in Belgrade in 1999, the bombing of Iraq and the plane incident in April 2001 have not improved the relationship. Given the

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[96] John Pomfret, "China warns of new arms race," *Washington Post*, November 11, 1999, p.A1; Erik Eckholm, "China says US missile shield could face an arms build-up," *New York Times*, May 11, 2000.

[97] Bernd Kubbig, "BMD and arms control," in: Burkard Schmitt and Julian Lindley-French, eds., p.41-42.

strategic logic, NMD might also bring Russia and China closer together. Some signals – such as common declarations about NMD – were visible in this regard.[98]

The major difference between China and Russia is that the former has currently only twenty nuclear-armed intercontinental missiles not on alert, while Russia still possesses thousands. China has always had a so-called minimum deterrence force structure and declaratory policy (including no-first-use). While it has started modernizing its nuclear arsenal, NMD may force the Chinese to expand it considerably. A National Intelligence Estimate (NIE) of August 2000 predicted that: "China would expand its relatively small arsenal of roughly 20 long-range missiles…up to 200 warheads by 2015."[99] This would go against the general trend towards smaller nuclear arsenals and may, therefore, have a negative effect on the existing nonproliferation regime (and undermine the objectives of NMD). The same NIE further predicted that if there is a Chinese build-up, India and Pakistan may follow. A new nuclear arms race therefore may be in the making, this time in Asia, and possibly extended to the Middle East. As former National Security Adviser Samuel Berger stated in an op-ed at the beginning of 2001: "It is suggested that we can work this out with China by at least implicitly giving it a 'green light' to build up its ICBM arsenal to levels that would not be threatened by our national missile defense. This strategy fails to take into account the dynamic it could unleash in Asia: Would China's missile buildup stimulate advocates of nuclear weapons in Japan? How would India view this 'separate peace' between the US and China? What effect would that have on Pakistan and the Koreas?"[100]

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[98] John Pomfret, "Moscow-Beijing Treaty is sought to counter US," *International Herald Tribune*, January 15, 2001; see also the Sino-Soviet Agreement of 16th of July 2001.

[99] Quoted by John Isaacs, "Arms Control in the Bush administration: cautious optimism," *Global Beat*, December 18, 2000.

[100] Samuel Berger, "Is this shield necessary?" *Washington Post*, February 13, 2001.

Stephen Cambone, before entering the Bush administration, on the other hand, wrote: "The US should *not* offer an 'assured destruction' relationship to China. The balance of forces between the sides and the nature of our relationship does not suggest such an approach."[101] This is, however, a very U.S.-centered point of view. Why does China possess intercontinental ballistic missiles and why? Who defines "assured destruction"?

In addition, nuclear weapons also play an important prestige role in international politics. It is not by chance that the five official nuclear weapons states - the United States, Russia, China, France and the United Kingdom - also form the Permanent-5 in the United Nations Security-Council, where they have a permanent veto right, and that the losers of the Second World War - Germany and Japan - still do not possess nuclear weapons, although they are technologically able to build them. In other words, power in international politics apparently depends on the possession of a nuclear arsenal. While it is true that the United States already possesses many more nuclear weapons than China, it can be argued that the United States cannot be absolutely certain that it can implement a successful first-strike, although this is of course debatable. NMD, however, would be the fatal blow to the Chinese deterrent.

China is technologically less advanced than the United States, even more so than Russia. NMD and the corresponding spillover effects to modern conventional weaponry and space-related issues may further affect what is a Chinese inferiority complex. It will certainly not make the Chinese feel more integrated in the international community. This is, as with the Russian case, basically a psychological issue, although the point about conventional weapons should not be under-estimated, especially in relation with Taiwan.

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[101] Stephen Cambone, "Threats and risks prompting a commitment to BMD," in Burkard Schmitt and Julian Lindley-French, eds., p.15. My emphasis.

It is hard to believe that China will agree to large-scale NMD system or a limited one that can easily be upgraded. For this reason, the Chinese are already being obstructive at the fissile material cut-off negotiations at the Conference on Disarmament (CD) in Geneva. If NMD goes through, the chance is high that these negotiations will remain blocked. The latter may on its turn have a very negative influence on the 2005 NPT Review Conference because a so-called Cut-Off Treaty was the "minimum minimoris" the Non-Nuclear Weapon States and the Nuclear Weapon States agreed upon in 2000. As already stated, China can also export dangerous technology to "states of concern". Some Chinese have also threatened to shoot down satellites circling over its territory.

The only strategy that the Chinese may accept is a very limited NMD system, that is able to neutralize at most twenty missiles (i.e. option two), whilst at the same time offering an arms control package that includes substantial reductions, a no-first-use declaration and a treaty banning space-based weapons. China has no objections against lower-tier TMD (option one). As Sha has indicated: "There is a gray area here…. China is not opposed to (TMD)…to protect troops and military bases."[102] This picture, however, would change dramatically if the United States decided to help Taiwan with TMD.

To conclude, there are many reasons from a nonproliferation point of view why the United States should not build NMD. Whatever its limitations, the ABM Treaty was framed upon an extremely strong idea: limiting missile defense in order to prevent strategic instability. Although the former bipolar systemic structure has moved to a rather undefined system, there remain strong regional powers with substantial nuclear weapons arsenals in an "anarchic" world in which tensions and conflicts remain. The basic logic behind a kind of ABM Treaty is therefore still valid, whatever its opponents may claim. The best alternative to protect itself against the potential threat by states like Iraq, Iran or North Korea is a strengthened nonproliferation regime, including a more

[102] John Pomfret, "Beijing eases stand on Missile Defense," *Washington Post*, March 15, 2001.

economically and diplomatically pro-active nonproliferation policy. However, the domestic political situation in the United States is such that it will probably deploy at least some kind of strategic missile defense. In that case, option two is the most that should be allowed from a strategic stability point of view.

Table 2: Assessment of the U.S. missile defense options

			Option one: lower-tier TMD	Option two: limited NMD without rapid break-out	Option three: (limited) NMD with rapid break-out potential	Option four: extensive NMD
Technological feasibility			Probably feasible	Feasible?	Feasible??	Feasible???
Financial cost			Tens of bn $	50-100 bn $	100+ bn $	250+ $
Threat			Short-range missiles (for instance of Iraq, Iran and North Korea)	A few (at most 20) long-range missiles of future "states of concern"; small accidental launches by Russia	Idem, with potential against Chinese and possibly Russian deliberate use; massive accidental launches by Russia	Idem, though even larger
Strategic implica-tions	**Russia**		OK	Negotiable	Not OK	Not OK
	China		OK	Negotiable?	Not OK	Not OK
	ARMS CONTROL	**ABM Treaty**	Compatible	Not compatible; amended or new ABM treaty	Not compatible	Not compatible
		Other (START, NPT, …)	OK	Depends on the reaction of Russia and China	Probably severe negative consequences (cut-off, MTCR, NPT,…)	Idem

4. Conclusion

There is a remarkable consistency among the four variables affecting the possible choice of an American missile defense system. Deploying only lower-tier TMD (option one) is technologically and financially most feasible, and the only option that matches the current and foreseeable threats. Lower-tier TMD systems are basically uncontroversial in Russia and China[103].

With regard to NMD, the outcome is the opposite. As Flora Lewis remarked: "There are so many different reasons to oppose this frenetic techno-fantasy that the real question is why the advocates are pushing it so hard."[104] There is every reason to limit NMD. The basic one is that Russia and especially China will not accept a large-scale system or even a limited system, that can rapidly break-out to an extensive one. This is a matter of strategic stability, in the next decades. In addition, the technology for extensive systems is by far not ready and it will cost an enormous amount of money to build such an extensive NMD system.

All these factors imply that option two is the most the United States may plan to deploy. This applies not only to the medium but also to the long term future, except if relations with Russia *and* China become similar to the United States' relationship with Europe.

The final NMD architecture should be limited, only capable of defending against a few (at most twenty) long-range missiles. Technically speaking, this means that no ABM components should be allowed that could enable rapid break-out to an extensive NMD system that could defend against the Russian and Chinese nuclear arsenals. This means that there would be no place for space-

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[103] Except with regard to Taiwan.

[104] Flora Lewis, "Missile defense: Cold Warriors prolong the nuclear menace," *International Herald Tribune*, April 28, 2000.

based sensors (such as SBIRS-low), let alone space-based weapons,[105] more than one ABM X-band radar, or the Navy Theater Wide TMD system.

All this should be part of a formal bilateral or even multilateral agreement, a kind of new ABM Treaty, or even part of a new strategic stability pact including both defensive and offensive systems. Its goal would be to limit the number of ABM components - like in the original treaty, but maybe with fewer conditions attached - and outlaw ABM components that can be used for rapid break-out toward an extensive NMD system. Article 1 (that forbids nationwide missile defense) and Article 5 (forbidding non-ground-based systems) of the ABM Treaty should, for instance, be adapted. Article 6 (forbidding non-ABM interceptors able to counter strategic missiles) and Article 9 (forbidding sharing technology) in contrast can, for instance, be kept.

To compensate for the loss of the ABM Treaty, a serious commitment to a radical package of new arms control and disarmament measures is needed in order to save and strengthen the existing nonproliferation regime.[106] Reductions should be made irreversible and verifiable. However outdated they might nowadays appear, bilateral arms control negotiations are still the best means to accomplish this task. At least the following package should be part of it:

a) a newly negotiated bilateral arms reduction treaty (START III) with:
   - maximum 1,000 strategic nuclear weapons deployed on both sides, most on de-alert status;
   - a maximum overall level of 1,500 nuclear warheads on both sides;
   - a ban on and the elimination of sub-strategic nuclear weapons;

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[105] For a similar recommendation, see Ivo Daalder, "Missile defenses: the case for a limited insurance defense," prepared statement for a hearing on NMD in the Danish parliament, April 25, 2001. Also Glaser and Fetter recommend limits on sensors, see: Charles Glaser and Steve Fetter, "National Missile Defense and the future of US nuclear weapons policy," p.81.

b) the start of further strategic nuclear arms reduction negotiations (with or without the other Nuclear Weapon States)(START IV);

c) a no-first-use declaration, not only restricted to attacks with conventional weapons;

d) a treaty banning space-based weapons;[107]

e) a treaty banning the production of fissile material for military purposes (cut-off); and

f) the ratification of the CTBT.

On the other hand, a limited NMD system without a rapid break-out capability (option two) can be effective against the aforementioned threat and should not be limited to a ground-based, mid-course system as was planned by the Clinton administration. The first stage of the Clinton plan could, for example, be combined with a limited ground-, sea-, and/or air- based boost-phase system as long it is technically and politically feasible, as well as with upper-tier THAAD TMD.

Setting arms control limits goes against the intuitive reaction of the military, which wants to leave all options open, and against that of the bureaucracy in general, which always want more personnel, money, prestige, and authority, regardless of the strategic rationale behind the programs.

The above-mentioned approach also goes against the natural tendency of the Bush administration and maybe even against current thinking in U.S. foreign policy circles in general. The list of treaties in which the United States is not interested (anymore) grows, so to speak, every month: the Comprehensive Test Ban Treaty, the ABM Treaty, the Kyoto Treaty, the Biological Weapons Protocol, the International Criminal Court, a global agreement to curb illicit sales of small arms and light weapons, etc. *The Economist*'s reaction to the CTBT non-ratification in 1999 was blunt but typical: "If America refuses multilateral entanglements, it may be blissfully free; but it will also be

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[106] Amb.Rolf Ekeus even favored linking NMD to the elimination of nuclear weapons. See James Moltz, "The impact of NMD on nonproliferation regimes," p.68.

[107] Jim Heintz, "Russian urges space arms ban talks," *Associated Press*, April 11, 2001.

alone. It will be a leader with no one to lead, in a world made unstable by its very isolation. This is sovereignty, all right. But a superpower should be bigger, and wiser, than that."[108] September 11 is just a reminder. A new missile defense treaty is an opportunity.

[108] "America's world", *The Economist*, October 23, 1999. For a similar version, see H.Greenway, "Europeans dismayed by US arrogance," *The Boston Globe*, April 9, 2001.

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The Center is supported by an endowment established with funds from Robert and Renée Belfer, the Ford Foundation and Harvard University, by foundation grants, by individual gifts, and by occasional government contracts.