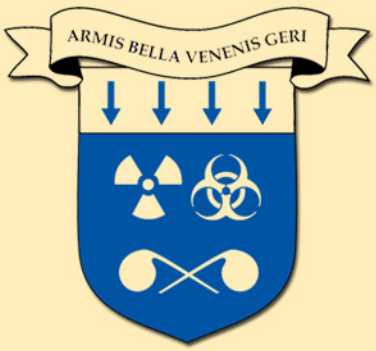
Emerging Missile Challenges and Improving Active Defenses

Jeffrey A. Larsen and Kerry M. Kartchner



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by

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Air University
Maxwell Air Force Base, Alabama

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Emerging Missile Challenges and Improving Active Defenses

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I. The Rationale for Missile Defense

The 1993 Counterproliferation Initiative (CPI) was an implicit recognition by the U.S. government that despite the best efforts of the international community in nonproliferation and arms control, some weapons of mass destruction and the means for their delivery were going to fall into the hands of the world's bad actors. Since that was likely to happen, it was only prudent to prepare.

The CPI specifically called upon the U.S. military to include planning for active and passive defenses in its spectrum of defense responsibilities. Its focus was primarily on tactical concerns, as defenses in the theater would "neutralize or mitigate the effects of WMD [weapons of mass destruction] and enable U.S. forces to fight effectively even on a contaminated battlefield."[1] In this context, it was envisioned that tactical and strategic ballistic missile defenses would play an integral role in protection of our deployed forces, our allies, and the American homeland.

In the realm of strategic ballistic missile defense of North America, however, the need is not so clear-cut, nor is there a consensus regarding deployment. The need for a new defensive concept was articulated by President Ronald Reagan and caught the public's attention in 1983 and in the years immediately thereafter. In the early 1990s a somewhat fragile consensus was formed, including both Republicans and Democrats, that a limited national missile defense system was needed, particularly after North Korea began testing its No Dong and Taepo Dong missiles and it became evident that Kim Jong Il's government was selling this technology to other states like Iran and Pakistan.

This missile defense system was simultaneously praised by proponents as deliverance from assured destruction, and reviled by opponents as too expensive, too destabilizing, and too technologically

challenging. This debate was finally settled by the George W. Bush Administration that withdrew the United States from the ABM Treaty in 2002 and deployed the first operational system in late 2004.

Some missile defense proponents rejected the idea that a world of mutual assured destruction (MAD) is somehow safer, that we should simply accept that the bomb is the ultimate weapon for which there is no defense. Rather, they believe that this reflects an immoral abrogation of a government's fundamental purpose: the protection of its citizens. The shift to a defense-dominant relationship between major powers is possible and must be pursued, according to this perspective.

Opponents have developed a standard set of criticisms that they roll out each time a new missile defense system is proposed: it won't work; it will cost too much; it will upset strategic stability by changing the accepted rules of international behavior; it could easily be overcome by offensive weapons and countermeasures, hence leading to an arms race; and (prior to 2002), it would violate the spirit of the Anti-Ballistic Missile (ABM) Treaty, thereby undercutting the cornerstone of arms control. Such beliefs, in fact, led the United States and the USSR to sign the ABM Treaty in 1972. This treaty and its restrictions on strategic defenses legitimized a world without defenses, one in which societal vulnerability was seen as the best way to ensure that logic prevailed between the two superpowers. If neither side could win a nuclear exchange, it was argued, no rational actor would ever start a war.

Tactical or theater missile defenses have been regularly highlighted in the annual Counterproliferation Program Review Committee reports, in which the regional Combatant Commanders prioritized their requirements in a list of Areas for Capabilities Enhancements (ACE). In every ACE list made public during the late 1990s, an active missile defense capability was ranked in the top five priorities. It was called different things each year: "active defense" (ranked 2nd) in 1995; "interception of cruise missiles" (2nd) in 1996; "theater ballistic missile active defense" (4th) in 1997, and "theater missile defense with minimum collateral effects" (5th) in another part of the 1997 report.[2]

The world has changed in the last few years; enough, in fact, to allow the deployment of a limited missile defense that is not strategically significant, and therefore non-provocative to Russia. This will provide some modest defense against rogue states in a world where ballistic missile

technology is proliferating to multiple countries, some of which may be undeterrable in the classic sense, and many of whom do not like America. The Bush administration is following in the footsteps of its predecessor, William Clinton's administration, by proposing a modest, limited missile defense system that includes both national and theater missile defense elements. The ABM Treaty is no longer an issue or impediment, and there was little international reaction to U.S. withdrawal from the treaty or its plans to deploy a limited system, given the reduced international level of tension between the United States and Russia. In addition, the world recognizes an acknowledged threat from rogue states like North Korea, and the likelihood of further multinational expeditionary military actions in far-flung corners of the world. Given this, and with defensive technology getting better, even some former opponents now say that missile defenses have finally reached the point where they make sense.[3]

II. Background: Early Efforts at Missile Defense[4]

After World War II and before the invention of the intercontinental ballistic missile (ICBM), the United States initially focused its air defense efforts against manned bombers. It investigated some early concepts for anti-missile and anti-satellite defensive systems, but these didn't really catch the public eye until 1957, when the Soviet Union tested an ICBM and launched Sputnik. Suddenly the country felt vulnerable to an adversary who could threaten America's heartland from above. Furthermore, the Soviets began to deploy their own Galosh ABM system around Moscow in the early 1960s. Clearly, something had to be done. Over the past five decades, the United States has been developing missile defense programs (see Figure 1) to meet this evolving threat.

Figure 1. Major U.S. Missile Defense Programs Since World War II

Decade	Program Name	Goal	Threat	Key Elements
1960s	Sentinel	"Thin" national protection	China	Spartan, Sprint missiles
1970s	Safeguard	Point protection of offensive forces	USSR	Spartan, Sprint missiles

1980s	Strategic Defense Initiative (SDI)	National or global protection	USSR	Exotic defenses, including space-based, plus missiles
1990s	Global Protection Against Limited Strikes (GPALS)	Global and theater protection	Russia (limited strikes), Rogue States	Ground and space-based missiles
1990s	Theater Missile Defense and National Missile Defense	Theater first; national secondary	Rogue States	Ground and sea-based missiles
2000s	Missile Defense	National and theater	Adversary State, accidental launch	Ground & sea-based missiles, airborne laser

Missile Defense Programs, 1957-1993

Nike Zeus. The first effort at developing an anti-ballistic missile missile used a spin-off of the Nike Hercules intermediate-range ballistic missile system. Nike Zeus proved itself capable of downing a satellite with a nuclear warhead. It was successfully tested in the late 1950s but had many technical difficulties.

Nike X. The successor to Nike Zeus, Nike X, was an Army program in the early 1960s. This research and development effort witnessed many advances and proposed a two-tier layered defense system to defend the country. Nike X became the Spartan missile, and the program was rolled into the first true national missile defense effort, the Sentinel program.

Sentinel. President Lyndon Johnson made a decision in 1967 to deploy a thin national defensive system against a Chinese threat. Originally, proponents of Sentinel called for a robust missile defense network that could thwart the Soviet offensive missile threat. But recognition that it would be near-impossible to create a perfect defense against a large Soviet threat, and the Soviet unwillingness to negotiate away their strategic defenses at the June 1967 Glassboro (New Jersey) Summit, convinced Johnson to pressure Congress into approving deployment of Sentinel.

The Sentinel plan called for placing several hundred Spartan and Sprint missiles at 14 locations across the United States, including 10 major cities. This, in turn, led to public concern about nuclear warheads exploding overhead, or the possibility that merely deploying defenses could provoke a

Soviet first strike attack to take out the system (making these sites "megaton magnets"). Sentinel was thus a compromise program between demands in some quarters for a system that would provide limited protection, and those who argued it was a mistake to deploy any defensive system, using the standard arguments described above. Its public rationale was, in part, to provide a defense against the emerging Chinese long-range ballistic missile threat, while avoiding an action-reaction phenomenon in U.S.-Soviet relations that could lead to an arms race.[5]

Safeguard. President Richard Nixon changed the name for his smaller version of Sentinel. This was a system that no longer attempted to be nationwide and moved the ABM sites away from cities in order to protect U.S. second-strike forces at bomber bases and ICBM missile fields. Safeguard was originally envisioned to be based at six to twelve sites. Two of those actually began constructing their silos for the interceptor missiles: Grand Forks AFB, North Dakota, and Malmstrom AFB, Montana. Safeguard would employ only a few hundred Spartan and Sprint missiles, using the same two-layered approach as was planned for Sentinel. The 1972 ABM Treaty limited each side to two sites (the United States chose to defend the ICBM fields at Grand Forks and the national capital of Washington). The 1974 Protocol to the ABM Treaty further limited each side to one site. Grand Forks was the only location to become operational. On October 1, 1975, the Safeguard site began operations, the only such capability the United States had fielded until 2004. The next day, Congress cut its funding, questioning the value of a single site in the north central Midwest. It closed in February 1976.

The Strategic Defense Initiative (SDI). In March 1983, President Ronald Reagan called upon American scientists to undertake what has since become the nation's largest and most expensive weapons system program. In a visionary speech, Reagan asked the United States to build a defensive system that would make nuclear weapons "impotent and obsolete." As he put it,

> What if free people could live secure in the knowledge that their security did not rest upon the threat of instant U.S. retaliation to deter a Soviet attack, that we could intercept and destroy strategic ballistic missiles before they reached our own soil or that of our allies?[6]

Reagan created the Strategic Defense Initiative Organization (SDIO) in 1984 to lead the effort. Initially SDIO focused most of its research on exotic weapons, including directed energy weapons and space-based systems. The arguments for and against SDI were virtual repeats of those heard during the Sentinel and Safeguard debates of the previous two decades. Nonetheless, the magnitude of the effort scared the Soviet Union, which tried desperately to eliminate this latest U.S. threat to MAD stability. The Soviet concern was evidenced by its willingness to trade away its strategic offensive forces at the arms control negotiating table in return for constraints on SDI. (This was most obvious in Soviet Secretary General Mikhail Gorbachev's proposal at the Reykjavik Summit in October 1986.)[7] The program became less grandiose after a couple of years of research showed that space-based systems had a long way to go before they would be mature, deployable weapons. In 1985, Paul Nitze, a senior State Department arms control adviser, had provided a formula for deployment that included three criteria. These were similar to the four-part approach that the Clinton administration would take ten years later. In order to be considered, according to Nitze, ballistic missile defenses had to be effective, survivable, and cost effective at the margins (in order to prevent the other side from simply deploying more offensive forces).[8]

Theater Missile Defenses (TMD). President George H.W. Bush sponsored a review of the SDI program from 1989 to 1990 led by Ambassador Henry Cooper. While Cooper remained an advocate of a national missile defense program that included a space-based system involving thousands of small satellites called Brilliant Pebbles, the findings of his study called on the United States to shift its defense research emphasis from strategic defenses over North America, to the protection of deployed forces and allies against limited attacks.[9] The Coalition's experience with Iraqi Scuds in Desert Storm in 1991 certainly influenced this recommendation. These suggestions to focus on theater defenses became policy.

Global Protection Against Limited Strikes (GPALS). President Bush changed the strategic defense program dramatically in 1991. Given the supposed success of Patriot ABM batteries in the first Gulf War, Bush reinvigorated the ballistic missile defense program. The new program, while robust, was smaller than SDI. GPALS was composed of three main parts: a ground-based national missile defense comprised of 750 missile

interceptors at six sites, a ground-based theater missile defense, and a space-based global defense (using Brilliant Pebbles). The Missile Defense Act of 1991 (discussed below) lent badly needed Congressional support to the revised program.

Accidental Launch Protection System (ALPS). Senator Sam Nunn (D-GA) suggested a compromise approach that would provide an alternative to GPALS with a smaller and more affordable system, one that would be able to defend against an accidental launch of a few missiles or a small attack by a rogue commander. ALPS would require improved theater missile defenses and modest adjustments to the ABM Treaty that would allow the deployment of limited national missile defenses to counter accidental launches and limited strikes. While this was a system offered as a compromise and was never officially blessed, it is of interest today because it reflects much of the current system deployed in 2004.

Programs Since 1993

The Counterproliferation Initiative was released in 1993. That same year, the Bottom-Up Review of U.S. security policy and the Defense Department was published. This study laid out a three-part missile defense program, which gave top priority to theater missile defense (TMD) efforts. Its key elements included the Patriot anti-aircraft missile and its upgrades, the Army's Theater High Altitude Air Defense (THAAD) missile, and the Navy's Aegis Area Defense program.

When the Clinton administration arrived in Washington, Secretary of Defense Les Aspin renamed SDIO the Ballistic Missile Defense Organization (BMDO) to reflect this new emphasis on TMD. To many, this signaled the end of the SDI decade—though even Aspin gave SDI credit for helping win the Cold War. As discussed later, in its second term the Clinton administration agreed to pursue a national missile defense system, and George W. Bush came into office in 2001 convinced of the need to push such a system forward to actual deployment.

Before reviewing the events and systems of the past decade, however, we need to examine the post-Cold War threat to the United States that has driven concern over the need for theater and ballistic missile defenses.

III. The Current Threat

In addition to the obvious desire to protect one's homeland from the ravages of missile attack, many analysts today believe that theater missile defenses are a necessary component of any expeditionary military operation. The growing number of countries that possess short or intermediate-range missiles makes it crucial to have TMD to protect one's forces and allies. Some 20 states have ballistic missiles today, and one count places the number of nations with cruise missiles at 77.[10] Given the precedents set in recent wars, states are not hesitant to use cruise or ballistic missiles when it serves some military purpose. Witness the Iran-Iraq War (1980-1988), the first Gulf War in 1991, and the increasingly common U.S. reliance on land-attack missiles as shown in Operations Desert Fox (Iraq, 1998), Allied Freedom (Kosovo, 1999), Enduring Freedom (Afghanistan, 2001), and Iraqi Freedom (2003).

The technology necessary to develop ballistic or cruise missiles is no longer exotic or difficult. Many states in all regions of the globe have at least a rudimentary force of missiles, and some rogue nations are pursuing longer-range systems that can threaten the United States or its allies in Europe and East Asia.

The current U.S. push for deploying an initial missile defense capability is driven by a perception of a growing and increasingly unpredictable ballistic missile threat. While some have argued that the proliferation of ballistic missiles is actually declining and that the number of long-range missiles is actually decreasing from the levels of the Cold War, the ballistic missile threat to the United States, its friends, allies, and forces deployed abroad, can best be understood in view of the following key assertions frequently attested to by Intelligence Community officials.

First, the U.S. Intelligence Community has repeatedly asserted that missile capabilities are growing. Those countries with ballistic missile programs continue to improve their capabilities in terms of range, payload capacity, and reliability.

Second, the number of missiles of all ranges is increasing. Medium- and short-range ballistic missile systems already pose a significant threat to U.S. interests, forces, and allies overseas.

Third, there has been increased trade and cooperation among countries that have been recipients of missile technologies. According to

an unclassified summary of a recent National Intelligence Estimate (NIE), "Proliferation of ballistic missile-related technologies, materials, and expertise—especially by Russian, Chinese, and North Korean entities—has enabled emerging missile states to accelerate missile development, acquire new capabilities, and potentially develop even more capable and longer-range future systems."[11] Ballistic missile technology based on early Russian Scud missiles, in particular, has been widely distributed and proliferated. In some cases, such as Pakistan and North Korea, countries that were at one time the recipients of ballistic missile technology (Pakistan from both the United States, in terms of space launch technology, and North Korea from the Soviet Union, in terms of military hardware) have now become exporters of expertise, components, systems, and production capabilities.

Fourth, a small number of countries continue to work toward longer-range systems, including ICBMs, often under the guise of developing a peaceful space launch capability. Once a nation has achieved the ability to place an object in space, they have in effect acquired the ability to also deliver a comparably sized weapons payload anywhere on the face of the earth.

Fifth, while only a relative handful of countries have significant ballistic missile capabilities, some of those countries are among the least responsible in the world, have expressed the most hostility toward the United States, and have demonstrated a disregard for international agreements and norms of behavior. Moreover, these regimes are seeking to acquire both long-range ballistic missile capability and weapons of mass destruction, including biological, chemical, and nuclear weapons. It is this confluence of WMD proliferation and ballistic missile technology that is particularly worrisome. This is partly why the U.S. Intelligence Community has assessed that "the probability that a missile with a weapon of mass destruction will be used against U.S. forces is higher today than during most of the Cold War, and will continue to grow."[12]

Ballistic missiles are not the only emerging threats of concern. Over the next ten years, the U.S. Intelligence Community believes that at least nine countries will be involved in producing cruise missiles, and of these, several will make their missiles available for export.[13] Cruise missiles are easy to build or acquire, they are relatively cheap, they are easily transportable, and they require less maintenance, training, and logistical

support than either manned aircraft or more sophisticated ballistic missiles. They have long flight ranges and potentially high accuracy. Because they can fly at low altitudes, they are difficult to detect by traditional radar. This difficulty (or advantage) is compounded by a low radar cross-section, which can be reduced even further by using signature reduction technologies. Moreover, the effective employment of U.S. Navy and Air Force cruise missiles for precision strikes against land-based targets in both the 1991 and 2003 Gulf Wars has reinforced the perception that cruise missiles are an attractive counterforce option. The United States also has, on several occasions, employed them in a retaliatory or coercive role.[14] Currently, it is estimated that there are over 80,000 cruise missiles in the arsenals of over 70 nations. Consequently, virtually all U.S. theater missile defense systems have been designed and tested with some capability against cruise missiles.

U.S. intelligence has also addressed the question of the political motivation behind the growth in ballistic missile technology. In Senate testimony, intelligence officials have stated that:

> [A]cquiring long-range ballistic missiles armed with a weapon of mass destruction probably will enable weaker countries to do three things that they otherwise might not be able to do: deter, constrain, and harm the United States. To achieve these objectives, the missiles need not be deployed in large numbers; with even a few such weapons, these countries would judge that they had the capability to threaten at least politically significant damage to the United States or its allies. They need not be highly accurate; the ability to target a large urban area is sufficient. They need not be highly reliable, because their strategic value is derived primarily from the implicit or explicit threat of their use, not the near certain outcome of such use. Some of these systems may be intended for their political impact as potential terror weapons, while others may be built to perform more specific military missions, facing the United States with a broad spectrum of motivations, development timelines, and resulting hostile capabilities. In many ways, such weapons are not envisioned at the outset as

> operational weapons of war, but primarily as strategic weapons of deterrence and coercive diplomacy.[15]

IV. The Rumsfeld Commission Report

Current ballistic missile threat perceptions, as they pertain to political support for the U.S. missile defense program, are largely a product of two key events: the publication in July 1998 of the Rumsfeld Commission report and the August 1998 launch of the North Korean Taepo Dong, a prototype long-range ballistic missile, which was widely interpreted as confirming the assessments contained in the Rumsfeld Commission report. This section provides some background on perceptions of the emerging ballistic missile threat that precipitated the current missile defense program, and how those threat perceptions evolved up to the present.

In November 1995, the National Intelligence Council, which is made up of 13 intelligence agencies, released its 1995 National Intelligence Estimate (NIE).[16] According to reports that began appearing in newspapers, this NIE concluded "no country, other than the major declared nuclear powers, will develop or otherwise acquire a ballistic missile in the next 15 years that could threaten the contiguous 48 states or Canada." This conclusion was controversial, especially in Congress. Many Republicans, who had assumed majority control a year earlier in the 1994 elections, charged that the NIE's conclusions had been leaked to the press in order to help defeat support for increased funding for missile defenses.

Critics charged that this report contained a number of flaws, contradictions, and ambiguities. They also charged that the authors of the report had downplayed the potential impact of foreign assistance to countries developing ballistic missiles, had underestimated the impact of space launch vehicle development on missile proliferation, and assumed that countries that currently have missiles will not sell them. It was further asserted that the report discounted the threat posed by long-range missiles in China and Russia. To Congressional representatives of Alaska and Hawaii it was especially troublesome that the report had excluded their respective states from the territory to be defended against missile attack.

Consequently, Republican leaders in Congress ordered the Intelligence Community to reexamine the evidence, to assess whether the intelligence conclusions were justified, and to determine whether the Clinton administration had exerted undue influence in "politicizing" the process, thus impairing the integrity of this Intelligence Community product.

Robert Gates, former deputy national security adviser and director of the Central Intelligence Agency during the first Bush administration, was chosen to chair the panel, which reviewed the available intelligence and the process used to compile the NIE's conclusions. It issued its own report in December 1996. Gates's Panel concluded that "the intelligence community has a strong case that for sound technical reasons, the United States is unlikely to face an indigenously developed and tested intercontinental ballistic missile threat from the Third World before 2010."[17] Further, the Gates Panel determined that there was "no breach of the integrity of the intelligence process." In nearly every respect, the Gates Panel endorsed the findings of the earlier 1995 estimate and dismissed the idea that the United States would soon be threatened by long-range ballistic missiles launched from rogue states. Thus, it provided additional ammunition to those claiming that there was little pressing need for increasing funding for missile defenses.

This did not satisfy the supporters of missile defense in the U.S. Congress. Unhappy with the Gates Panel conclusions, Congress chartered another group of outside experts to take a second look at the 1995 estimate. This time, Donald Rumsfeld, former Secretary of Defense in the Ford administration, was chosen to chair the panel, formally known as "The Commission to Assess the Ballistic Missile Threat to the United States," but more commonly known as the Rumsfeld Commission. This panel not only reviewed the intelligence used to produce the 1995 estimate, but interviewed scores of outside experts on missile technology and proliferation. It issued its report on July 15, 1998, and, unlike the endorsement of the Gates Panel, this report challenged many findings of the reported 1995 estimate.

The Rumsfeld Commission's principal conclusion was that a country like North Korea could deploy an ICBM "within about five years of a decision to develop" one.[18] Among its other key findings, the Rumsfeld Commission concluded that the ballistic missile threat to the United States was real and growing; this threat was greater than previously assessed; and

the United States may have little or no warning of new threats. The report's conclusions were spelled out in an executive summary:

- Concerted efforts by a number of overtly or potentially hostile nations to acquire ballistic missiles with biological or nuclear payloads pose a growing threat to the United States, its deployed forces and its friends and allies.
- The newer ballistic missile-equipped nations' capabilities will not match those of U.S. systems for accuracy or reliability. However, they would be able to inflict major destruction on the United States within about five years of a decision to acquire such a capability. During several of those years, the United States might not be aware that such a decision had been made.
- The threat to the United States posed by these emerging capabilities is broader, more mature and evolving more rapidly than has been reported in estimates and reports by the Intelligence Community.
- The Intelligence Community's ability to provide timely and accurate estimates of ballistic missile threats to the United States is eroding. This erosion has roots both within and beyond the intelligence process itself. The Community's capabilities in this area need to be strengthened in terms of both resources and methodology.
- The warning times the United States can expect of new, threatening ballistic missile deployments are being reduced. Under some plausible scenarios—including re-basing or transfer of operational missiles, sea- and air-launch options, shortened development programs that might include testing in a third country, or some combination of these—the United States might well have little or no warning before operational deployment.[19]

In certain key respects, this report directly contradicted earlier reports. For example, both the 1995 intelligence estimate and the Gates Panel assumed that the United States would have ample warning of the development of a strategic ballistic missile threat in time to allow an adequate missile defense to be developed to counter that threat. In

contrast, the members of the Rumsfeld Commission concluded unanimously that the United States needed to assume that there might be *no strategic warning* of a rogue state's acquiring the capability to strike the United States with a long-range ballistic missile.

The Rumsfeld Commission report explained that three crucial factors were shaping the emerging ballistic missile threat.

1. *Different Standards:* Missile developing countries don't use the same accuracy, safety or environmental standards as would the United States. Therefore, their programs can move ahead much faster than assumed.
2. *Foreign Assistance:* Sale of components or even complete missile systems, together with substantial technical assistance from foreign powers, can help accelerate the development of a rogue state missile threat much faster than assumed.
3. *Concealment and Deception:* Rogue states determined to pursue developing ballistic missiles take great care to conceal their ballistic missile and WMD programs from Western intelligence services—which makes it much harder for the intelligence community to accurately predict these threats.[20]

V. The North Korean Missile Test

The Rumsfeld Commission report was released in late July 1998. Had it not been for an event that transpired within weeks of its release, this report may have simply been additional fodder in the partisan battles over missile defense funding and the fate of the ABM Treaty. However, on August 31, 1998, North Korea launched a ballistic missile named the Taepo Dong, thus confirming that North Korea did in fact have a program for developing long-range ballistic missiles. Even though the missile ultimately failed to place its payload into orbit, this launch was widely interpreted as validating the Rumsfeld Commission's conclusions. While the U.S. Intelligence Community had anticipated this launch, the missile itself demonstrated several key characteristics that caught Western intelligence services by surprise.[21]

In particular, the Taepo Dong missile launched by North Korea contained a third stage, considered an important feature of an intercontinental-range ballistic missile. It demonstrated the technology for third stage separation. It demonstrated advanced fuel technology. It showed that North Korea had critical command and control capabilities for launching and guiding such a missile. It had previously been assumed that these technical barriers to acquiring long-range ballistic missile capability would be hard for a rogue state to surmount.

In addition, the missile's flight demonstrated one other often overlooked feature with tremendous political ramifications that would reverberate for years to come. It overflew the territory of Japan. This violated an unwritten taboo in international space launch practice that dictated that flight tests of missiles should not overfly the populated territory of another nation, for the sake of avoiding the appearance of initiating a surprise attack. The fact that North Korea ignored this taboo had the effect of precipitating growing interest in and support for missile defense in Japan, Taiwan, and Australia.

But its most important consequence was to confirm the conclusions of the Rumsfeld Commission report, to energize and consolidate support for missile defense in the U.S. Congress, and to force the Intelligence Community to revise its threat assessment.

In response to both the Rumsfeld Commission's criticisms of its assumptions and methodology and to the political furor in the wake of the North Korean Taepo Dong launch, the Intelligence Community set about producing a new, revised report. This was released to Congress in 1999. According to Senate testimony by senior Intelligence Community official Robert D. Walpole, this report differed from previous reports in three important ways. First, it extended the period of assessment from 2010 to 2015. Second, the Intelligence Community, drawing on expertise both inside and outside the Intelligence Community, focused more on when a country *could* acquire an ICBM, in addition to assessing when they would be *likely* to do so. Third, the report recognized that a threat to the United States from a rogue state ballistic missile program would materialize before such a state had deployed an arsenal of missiles in the traditional sense; therefore, the Intelligence Community adopted the approach of using the first successful flight test to indicate an "initial threat availability."[22]

The 1999 NIE was entitled "Foreign Missile Developments and the Ballistic Missile Threat Through 2015." Preempting the possibility of a leak to the press, and in response to criticism that secrecy promoted the possibility of politicization, the CIA took the unusual step of preparing an unclassified summary of this report.[23] According to this public version, "Most Intelligence Community agencies project that before 2015 the United States most likely will face ICBM threats from North Korea and Iran, and possibly from Iraq – barring significant changes in their political orientations – in addition to the longstanding missile forces of Russia and China." In addition, the Intelligence Community confirmed that short- and medium-range ballistic missiles "already pose a significant threat overseas to U.S. interests, military forces, and allies."[24]

Finally, the 1999 NIE addressed the debate over whether rogue states would use technologically complex long-range ballistic missiles to deliver weapons of mass destruction to U.S. territory, or whether they would resort to other, less expensive, and less complex means of delivering weapons, such as by truck, ship, or airplane. The report asserted that, for the immediate future, attack by these other means was actually much more likely than attack by long-range ballistic missile, "primarily because nonmissile delivery means are less costly, easier to acquire, and more reliable and accurate." However, the report also stated "[m]issiles provide a level of prestige, coercive diplomacy, and deterrence that nonmissile means do not."[25] Subsequent NIEs have not varied substantially from the 1999 edition.

VI. U.S. Efforts Since 1993

To understand the priorities of U.S. missile defense efforts over the course of the decade that began in 1993, it is necessary to review the lessons learned from U.S. experiences with missile attack and missile defense in the 1991 Gulf War. This experience led to the formation of an unprecedented political consensus for developing and deploying TMD systems, reflected in the 1991 Missile Defense Act. However, this consensus did not extend to developing national missile defense (NMD) systems or defense against ICBMs, primarily due to a disagreement whether a long-range threat existed. There was also skepticism about the

technology for such a defense as well as continued support for the ABM Treaty, which limited defenses against long-range ballistic missiles, but did not restrict the development of defenses against short- and medium-range ballistic missiles, or against cruise missiles.

Theater Missile Defense Programs[26]

Prior to the 1991 Gulf War it was assumed by many defense planners that opponents armed with ballistic missiles would either be deterred from firing them against U.S. targets for fear of devastating retaliation, or U.S. forces would be able to relatively easily and quickly identify ballistic missile launchers with existing surveillance capabilities. Once such launchers had been identified, they would be targeted and destroyed before they could pose a substantial threat to U.S. or allied assets. It was further assumed that even if deterring such attacks failed, and even if the U.S. Air Force or Army Special Forces were unable to effectively preempt such threats, attacks by missiles would have relatively little strategic or political impact.

The reality of the U.S. experience in the first Gulf War, however, challenged and refuted these assumptions. The Iraqis were not deterred from using their ballistic missile assets, even against non-combatants like Israel. Mobile Scud launchers proved much more elusive than expected, and even more difficult to destroy with confidence. Even those that were damaged were often quickly reconstituted or replaced by reserve units. On February 25, 1991, a single Iraqi Scud missile slammed into a warehouse being used as billeting quarters for U.S. military personnel in Dhahran, Saudi Arabia, killing 27 Army reservists and injuring nearly 100 others. This was the single largest loss of life by any ally in the war. It marked a turning point in the debate over missile defense, and it led directly to renewed calls for developing and deploying theater missile defenses. It became clear in the aftermath of this attack that some kind of active theater missile defense would have to play an important role in protecting forward deployed forces in any future conflict.

The Dhahran attack also helped forge a new consensus in Congress on the need for theater missile defenses, and resulted in passage of the Missile Defense Act of 1991. Among many other provisions, this legislation urged the President to pursue immediate discussions with the

Soviet Union on amending the ABM Treaty to permit deploying additional missile defense interceptors, to increase utilization of space-based sensors, and to clarify the distinctions between TMD and ABM systems. This, in turn, led to a sustained programmatic emphasis on TMD acquisition that is now bearing fruit. The United States has begun deploying a family of highly capable TMD systems that are serving as the technological and operational precursors to more capable strategic missile defenses.

A consensus was building that TMD was necessary for America to carry out its foreign policy. As one analyst put it,

> [A] compelling case can be made for theater missile defense deployments in strategically sensitive areas where U.S. allies and friends face growing threats…well-designed, forward-deployed theater missile defenses could alleviate allied concerns, signal U.S. resolve for friends in need, and possibly intercept missiles carrying lethal weapons. The downside risks of having forward-deployed theater missile defenses near or in troubled regions are far lower than the risks of abstention.[27]

By 1993, two years after the conclusion of the Gulf War, the Army, the Navy, and the Air Force had all initiated new TMD development programs, or had accelerated existing ones. These programs can be divided into two categories: lower-tier interceptors, those that cover an area of 20 to 30 miles in diameter and seek to intercept missiles in range at altitudes of 10-20 kilometers, well within the atmosphere; and upper tier interceptors, those that can protect a much broader area and seek to intercept intermediate-range missiles at the edges of the atmosphere or even in outer space. The U.S. Army's Patriot missile and the Navy's Aegis air defense system are the most prominent examples of lower tier systems, and the Army's Theater High-Altitude Area Defense program is the most promising and mature of the upper tier systems.

Multiple systems are under consideration for the TMD mission. These have been undergoing continuous refinement and change for years as testing validates some and eliminates others.[28] Three systems were originally identified in 1993 as key elements of TMD; in addition, a fourth system was under consideration and would be decided in a "run-off" that would select either the Navy Upper Tier, the Air Force

Airborne Laser, or the Army Corps Surface-to-Air-Missile (SAM) (which later was removed from this competition when it became the multinational medium-range extended air defense system, or MEADS).

Other TMD programs that have been under development since 1993 include THAAD (under revision, no tests since 1999), Patriot Advanced Capability (PAC-3) (tested most successfully in Iraq March 2003), Navy Aegis Ballistic Missile Defense (first deployments scheduled in 2005), and the Airborne Laser (which has had test flights for the aircraft platform). In addition, the United States has three international programs which are fairly well advanced: Arrow, a joint production venture with Israel; a new program underway jointly with Japan; and MEADS, using the PAC-3 missile, with Germany and Italy.

Patriot. The Army first introduced the Patriot air defense system in its anti-theater missile defense role during the first Gulf War, where its performance was the subject of a fierce post-conflict debate.[29] The Patriot missile system was initially designed in the mid-1980s to be effective against both aircraft and short-range ballistic missile threats. However, due to concerns over possibly violating the ABM Treaty, its anti-missile capabilities were greatly constrained. Only when it appeared that a conflict with the Scud-armed forces of Iraq appeared imminent did the U.S. Army move rapidly to upgrade the Patriot missile systems' anti-missile defense capabilities on the eve of the war.

In the aftermath of the first Gulf War, it became clear that a more reliable and effective theater missile defense system was needed, and the Army contracted for the development of a follow-on to the Patriot system. The new system, dubbed the Patriot Advanced Capability 2, or PAC-2, incorporated hit-to-kill technology, rather than proximity blast fragmentation kill mechanisms. The PAC-2 came on line around 1995. This was immediately followed up by an even newer, more capable version of the Patriot system, based on an entirely new, much smaller, but faster missile, called the Patriot Advanced Capability-3. This system could defend a larger footprint than the older Patriots and PAC-2s. Even though it was faster and had greater range, it was a significantly smaller missile than the older Patriot, so that four missiles could be carried in the same container that before could only carry one. With four containers per mobile launcher, this increased the firepower of a Patriot unit from four missiles to sixteen missiles each. Each missile contained its own

radar for homing in on targets, rather than relying on a common, ground-based radar.

The first PAC-3 units were ready for deployment just prior to the second Gulf War, in 2003, where they were held largely in reserve for use against Scud missiles, which ultimately were never fired against allied forces. The older, less capable PAC-2s scored most of the successes against those shorter-range Iraqi missiles that were engaged. By 2005, some 350 Patriots will be modified to provide additional terminal protection against long-range missile threats. PAC-3 has been designed to defend against cruise missiles, as well, and has been shown to be effective in this role in tests against cruise missile-type targets.

Aegis. The U.S. Navy has a long history of developing capabilities for defense of its ships against threats from the air, including cruise missiles, anti-ship missiles, and, more recently, short- and medium-range ballistic missiles. With the post-Gulf War emphasis on theater missile defense, the Navy moved to upgrade its existing Aegis Combat System to give it anti-ballistic missile defense capabilities. The Aegis air defense system was first deployed in the 1970s, based on the standard family of guided surface-to-air missiles. In 1997, the Navy established a requirement for an upgraded missile that would have improved capabilities for intercepting ballistic missiles. This new missile entered development soon thereafter and was dubbed Standard Missile (SM)-3.

Aegis-equipped cruisers are deployed by other nations as well, which makes their conversion to TMD capabilities much easier. Japan operates four modified Arleigh Burke-class Aegis destroyers and plans to purchase two more. Spain is currently operating or building four F-100 class Aegis frigates, and Norway is procuring five of this same type. South Korea is building Aegis-equipped variants of its KDX destroyers, and Australia is also considering acquiring Aegis-equipped "Air Warfare Destroyers" that could, at a later date, be adapted for a theater missile defense role.

By early 2005, at least two Aegis destroyers are to be equipped with the new Standard Missile-3 interceptor, while 15 such ships are to be fitted with the surveillance and radar tracking systems that support the SM-3. By the end of 2005, the Navy hopes to have three Aegis destroyers equipped with a total of 22 SM-3 interceptors. SM-3 missiles

will also be designed with an inherent capability to defend against the cruise missile threat, just as is the case with PAC-3.

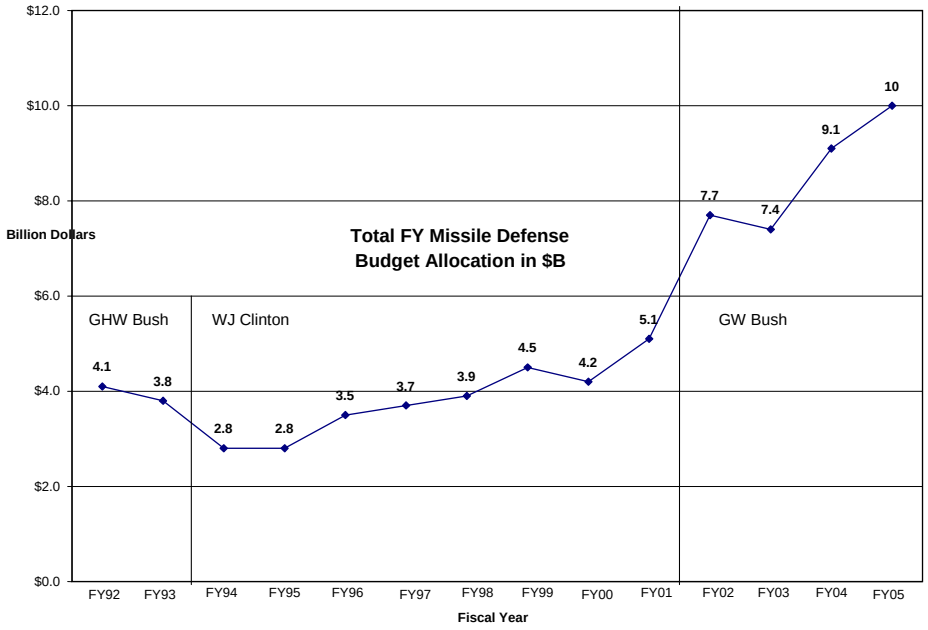
THAAD. In September 1992, the Army initiated the Theater High-Altitude Area Defense program, or THAAD. Currently, this is the most mature of the upper tier TMD systems in development. With a range of over 200 kilometers, and a maximum intercept altitude of 150 km, THAAD is designed to intercept both short- and medium-range ballistic missiles either within or above the atmosphere. THAAD will have a significantly more capable radar than the PAC-3, with the ability to acquire missile threats at ranges up to 1,000 km. In combination with the PAC-3, it will provide layered missile defense protection (that is, a shoot-look-shoot capability) for deployed forces as well as population centers. Low-rate initial production of up to 40 missiles per year is currently planned to begin in 2006. The U.S. Army is expected to acquire 80-99 THAAD launchers, 18 ground-based radars, and a total of 1,422 THAAD missiles. Like each of the other TMD systems discussed above, THAAD will also have a built-in counter-cruise missile capability.

Airborne Laser (ABL). The Air Force's contribution to tactical missile defense is a modified Boeing 747 aircraft carrying a large chemical oxygen-iodine laser. The laser will shoot down missiles during their first phase of flight, the boost phase. As originally planned, it will be able to hit short-range ballistic missiles but eventually ICBMs, as well. The aircraft is currently undergoing test flights, but for technical reasons it has not yet been mated with its laser. Plans call for two or three operational ABL platforms to be available between 2006 and 2008.

Long-Range Missile Defense Programs

Spending on TMD systems substantially increased following the first Gulf War and the passage of the 1991 Missile Defense Act, but funding for national missile defense programs actually decreased throughout much of the 1990s. The issue continued to be tied up in a rancorous debate over the fate of the ABM Treaty. See Figure 2.

Figure 2. U.S. Missile Defense Budget Allocations by Fiscal Year, 1992-2005



The contentious status of this debate began to change in the summer of 1998, with the release of the Rumsfeld Commission report and the North Korean launch of an intercontinental-range Taepo Dong. These consecutive events forced the Clinton administration to realign its priorities on missile defense, and it subsequently devised the so-called "3+3" plan. Under this plan national missile defenses would be developed and evaluated over a three year period, following which, if a decision were made to deploy them, a three year deployment plan would be adopted. The assumption was that given three years warning, the United States could deploy up to 100 interceptors (the ABM Treaty limit) at the old Safeguard site in North Dakota.[30]

The Clinton administration determined that it would evaluate any proposal to deploy missile defenses on the basis of four criteria: 1) whether the emerging ballistic missile threat justified proceeding with deploying missile defenses, 2) whether existing or prospective missile defense technologies were sufficiently effective and mature, 3) whether they were

affordable, and 4) an assessment of the ramifications of such a deployment on international strategic stability and U.S. arms control commitments. The administration also proposed a basic system architecture that would have consisted of 100 interceptors, a new ABM radar, and upgrades to five existing early warning radars. The primary purpose of announcing this architecture was not to provide a blueprint for the Defense Department but rather to provide overall negotiating guidance to those diplomats working to convince Russia to amend the ABM Treaty to allow such a deployment.

However, on September 1, 2000, President Clinton announced his decision to defer deployment of a national missile defense system, saying "the system as a whole is not yet proven," instead urging further research, development, and testing.[31]

VII. Missile Defense and the Bush Administration

Upon taking office in January 2001, the George W. Bush administration immediately began setting a radically different course for missile defense, making it the centerpiece of his new strategic framework for national security. President Bush and his senior foreign and defense advisers did not dispute the validity of the four criteria considered by the Clinton administration but believed that each of these criteria had been or could be met: The threat was imminent, the technology was available (or could be developed given freedom from ABM Treaty constraints); it was affordable; and the diplomatic and arms control ramifications could be managed. The Bush administration took a much more hostile stance toward the ABM Treaty. Rather than thinking of the Treaty as the "cornerstone of strategic stability," it was viewed more as an outdated "millstone" around the neck of American national security.

The administration soon dropped the "N" from "NMD" and began referring to "missile defense" more generically. This recognized that the distinction between TMD and NMD was becoming technologically blurred, especially for some U.S. allies. This move was also intended to signal that the distinction was an artificial construct of the ABM Treaty and that all missile defense systems should be considered as making a contribution to defeating the threat of ballistic missile attack. The administration announced that it would seek the necessary amendments to

the ABM Treaty to allow more robust testing of missile defense systems and their possible deployment in ways then prohibited by the ABM Treaty. But it also made clear that should Russia refuse to grant such amendments, the United States was prepared to exercise its right under Article XV to withdraw from the Treaty upon the expiration of a six month advance notification.

President Bush began laying the conceptual basis for missile defense by stating in a speech on May 1, 2001, that the United States needed "new approaches to deterrence," approaches that relied on both offensive and defensive means.[32] This was also part of a broad push for a "new strategic framework" for U.S.-Russian relations, one that would reduce the centrality of nuclear weapons and formal arms control agreements in the relationship. Finally, the administration restructured the Ballistic Missile Defense Organization, elevating its status by renaming it the Missile Defense Agency (MDA) and seeking substantial funding increases for a range of missile defense programs.

There was an increased recognition by all Americans of the real meaning of vulnerability following the September 11, 2001, attacks on New York City and Washington, D.C. If hijacked airplanes could wreak such devastation, wondered analysts, what damage could ballistic missiles with nuclear, chemical, or biological warheads do to the country? This led to a nonpartisan call for larger defense budgets, including funding for ballistic, cruise, and theater missile defense.

At about the same time, consultations began in earnest at all levels of diplomatic contact with Russia over amending the ABM Treaty. However, Russia resisted this, and warned that U.S. deployment of missile defenses would provoke a renewed arms race, obligate Russia to withdraw from the START Treaty, destroy further chances for new arms control agreements, lead to the utter collapse of the whole international arms control regime, undermine international efforts to combat the proliferation of weapons of mass destruction, and lead to a new Cold War between Russia and the United States. Consequently, these consultations did little to narrow the gap between the Bush administration and Russia over amending the ABM Treaty, or alternatively, fashioning a cooperative exit from the Treaty.

However, several converging factors forced a resolution of the impasse between the United States and Russia over amending the ABM

Treaty in the fall of 2001. The administration believed that a long-range ballistic missile threat to the United States could emerge at any time and was determined not to wait until such a threat had actually materialized to begin preparing for it. The longest lead-time item in the administration's missile defense program involved the construction of a new ABM radar on the island of Shemya, Alaska, where the short construction season mandated pressing ahead with an early decision to start. However, it was not clear at what point such construction plans would cross the line of noncompliance with the ABM Treaty. If the United States wanted to avoid outright violation of the Treaty, it would have to provide the requisite notice of withdrawal six months prior to the beginning of the 2002 construction season in Alaska—early in the fall of 2001. Furthermore, the administration wanted urgently to begin exploring other technological approaches to missile defense then banned by the ABM Treaty, and it wanted to test certain theater missile defense assets, such as the radars on Aegis cruisers, against strategic ballistic missile threats—a step that was also banned by the Treaty.[33]

The Decision to Withdraw from the ABM Treaty

On December 13, 2001, President Bush announced that the United States had given Russia formal notice of its decision to withdraw from the ABM Treaty, stating that "the ABM Treaty hinders our government's ability to develop ways to protect our people from future terrorist or rogue state missile attacks."[34] Within just a few hours of this announcement, the Russian government released a statement by President Vladimir Putin characterizing the U.S. decision as "a mistake" but stating that it was not a security threat to Russia (thus, there would be no arms race response), that Russia was determined to sustain improvements in U.S.-Russian relations (thus, there would be no return to the Cold War), and urging the United States to enter into a legally-binding agreement on further reductions in strategic offensive arms (thus, there would be prospects for further arms control arrangements between the United States and Russia).

It appears from later statements by key administration players that negotiations over amending the ABM Treaty finally broke down over apparent Russian insistence on granting the United States relief from ABM Treaty testing constraints only on a "case-by-case" basis, which

President Bush was entirely unwilling to do. In any event, this announcement set in play several things. First, in what amounted to a de facto quid pro quo, President Bush reversed his earlier opposition to a legally binding strategic offensive arms reduction agreement along the lines of the U.S. and Russian unilateral pledges issued at the November 2001 Crawford Summit. The Strategic Offensive Reduction Treaty – a follow-on to the START Agreement – was quickly negotiated and signed in Moscow on May 29, 2002. Second, U.S. withdrawal from the ABM Treaty became effective on June 14, 2002. But even prior to that date, the Defense Department began putting into place plans for several activities:

- testing TMD systems against long-range ballistic missile targets,
- planning an outreach effort to allies,
- calling on allies to participate with the United States in the development of a missile defense system, and
- developing ideas for deploying missile defenses outside the limits previously allowed by the ABM Treaty that would be presented to the President later in the summer of 2002.

Finally, and most importantly, these proposals to the President led to a second announcement from the White House, almost exactly a year later, that the United States would proceed to deploy an "initial defense capability" by the end of 2004.

Initial Defense Capability

Having secured virtual acquiescence from the Russian Federation in its break from the ABM Treaty, the Missile Defense Agency proceeded to conduct a series of tests that incorporated heretofore prohibited activities, including notably the participation of ship-based radar in two successive missile interceptor tests. Meanwhile, the Department of Defense began drafting plans for rapidly moving toward deploying some form of defense against long-range missiles by the end of the President's first term in office. Such plans were presented to the President in August 2002.

It is not clear from the public record exactly what options the Defense Department recommended to the President in August, but a few months

later, on December 17, 2002, President Bush announced that he had directed the Secretary of Defense to proceed with fielding "an initial set of missile defense capabilities" by 2004.[35] He noted that these capabilities would serve as a starting point for fielding improved and expanded missile defense capabilities later. His announcement also explicitly eschewed defining an "architecture" for the system or a broad outline of how all the pieces would fit together. In an accompanying Department of Defense news release, the administration simply said that there would be "no final or fixed missile defense architecture. Rather, the composition of missile defenses, including the number, type, and location of systems deployed, will change over time to meet the changing threat and take advantage of technological developments."[36]

The announcement contained mid-term as well as longer-term objectives. Future capabilities would be a product of the "spiral development" approach to evolving the system architecture, whereby new components would be evaluated for incorporation into the operational force at intervals, or "blocks," every two years. The capabilities planned for operational readiness in 2004 and 2005, or the first block, according to this announcement, would include:

- 20 ground-based interceptors, of which 16 would be located at Fort Greely, Alaska and 4 at Vandenberg AFB, California;

- up to 20 sea-based interceptors (using the Standard Missile-3) on three existing Aegis ships, whose radar and data processing systems would be upgraded to accommodate these missiles;

- additional Patriot Advanced Capability-3 units;

- upgraded sensors based on land, at sea, and in space, including upgraded radars at Shemya, Alaska; Fylingdales, UK, and upon approval from the Danish government, at Thule, Greenland; and

- an expanded Pacific Test Bed to provide greater flexibility in testing geometry (allowing, for example, launches of interceptors on a more realistic west to east trajectory, instead of the existing

restriction of launching from Vandenberg in an east to west trajectory).

This first set of initial capabilities falls far short of what the acquisition community would normally refer to as "Initial Operational Capability," or IOC, and has therefore been given a different moniker: "Initial Defensive Operations" (IDO) to denote that these capabilities will represent little more than test assets but will have some operational capability as well. For example, no actual test launches of missiles will be conducted from the silos at Fort Greely, since this would require flying over populated territory, something the United States has avoided throughout the nuclear era. All such tests will be from Kodiak Island, off the coast of Alaska, from the Vandenberg Air Force Base facility, or from the island of Kwajalein in the Pacific. However, the silos at Fort Greely will contain actual operational missiles that could be launched in the event of a crisis.

Under the approach announced by the President, and subsequently elaborated by Office of the Secretary of Defense (OSD) officials, this Initial Defensive Operations capability may be improved in the future through additional deployments at subsequent two-year intervals or blocks, such as deployment of additional ground- and sea-based interceptors, including:

- Patriot (PAC-3) units;
- initial deployment of THAAD;
- deployment of the Airborne Laser system;
- development of a family of boost-phase and midcourse hit-to-kill interceptors based on sea-, air-, and ground-based platforms; and
- development of enhanced sensor capabilities; and development and testing of space-based defenses.

Surveillance Systems

The radar and surveillance component of this initial capability could ultimately be its most important and lasting legacy. Several key programs are underway to upgrade U.S. and allied early warning and tracking

capabilities as a contribution to the missile defense mission. They include the following:

X-Band Radar. In order to discriminate between reentry vehicles and decoys or other countermeasures, the system requires an improved radar system in the X frequency band. Cold War radars, such as the Ballistic Missile Early Warning System (BMEWS) at Thule, Greenland, Fylingdales Moor, England, and Clear, Alaska, operate in the L band and lack the fidelity to differentiate between similar objects in space—a capability that has been shown during missile intercept tests by the prototype X-band radar on the Kwajalein Atoll. Accordingly, the plan calls for upgrades to the BMEWS sites and the development of a floating mobile X-band radar built on an offshore oil platform that, by 2005, can be moved to the region of greatest threat. In the interim, the Cobra Dane radar (an L-band system) on Shemya Island, Alaska, will be upgraded to provide some discrimination capability along the route of the most likely attack corridor from Northeast Asia.

Space-Based Infrared System (SBIRS). Formerly called the SBIRS-High system, this will consist of six satellites: four in geosynchronous orbit and two in an elliptical orbit. These will replace the existing Defense Support Program satellites and provide early warning of missile launches, nuclear detonation, or other thermal activity around the globe. In particular, they will track and discriminate among missiles during their flight, and provide sensor data to the battle management system. The first new satellite is scheduled for launch in 2006.

Space Surveillance and Tracking System (SSTS). Formerly called SBIRS-Low, this system envisions a constellation of satellites in low-earth orbit that would track and discriminate between incoming warheads and decoys. While SBIRS-Low originally projected a requirement for some 30 satellites to maintain global coverage, SSTS will initially deploy only two satellites, launched in 2007. At least 18 satellites will eventually be necessary to cover key areas of concern around the world.

XI. The Bush Plan for Missile Defense

In January 2002, Secretary of Defense Rumsfeld described the administration's missile defense objectives this way:

> First, to defend the U.S., deployed forces, allies, and friends. Second, to employ a Ballistic Missile Defense System (BMDS) that layers defenses to intercept missiles in all phases of the flight (i.e., boost, midcourse, and terminal) against all ranges of threats. Third, to enable the Services to field elements of the overall BMDS as soon as practicable.[37]

The specifics of the system were outlined in the 2001 Nuclear Posture Review, highlights of which were publicly released in January 2002, and at a Defense Department press conference in December 2002. Leading government officials identified the parts of the missile defense plan that they envisioned putting in place by the year 2008. These include an airborne laser to shoot down missiles during their boost phase, a ground-based interceptor force to hit reentry vehicles during the mid-course phase of their trajectory, sea-based missiles for defense against incoming warheads in the mid and terminal phases, terminal defenses against any long-range missiles that reach the United States, and a satellite system that can track missiles from launch to terminal phase and distinguish between warheads and decoys. All of this would be tied together by a far-flung command and control system. The program's goal was no longer to deploy a complete, working system to defend against specific threats; rather, it was to field missile defense capabilities as they became available, and then link them to the existing infrastructure.

The current plan for a layered missile defense of the United States and its deployed forces and allies therefore contains a number of different systems. The first part, tactical Patriot PAC-3 missiles, have already been deployed with U.S. forces in Iraq and proven themselves in combat testing there. The second phase will be the Ground-Based Mid-Course Missile Defense (GMD), which will see its first interceptor missiles placed on operational status sometime in 2004.[38] Other elements of the complex system are under development, as well. The aircraft for the Airborne Laser has had its first test flight; major strategic warning radar systems from the Cold War are being upgraded to handle the more stringent requirements of missile defense and warhead discrimination; sea-based point defense weapons and ships are being readied for deployment a year after GMD; the two space-based infrared satellite systems are under development; and, testing continues on additional tactical missiles, as well as a battle management system to tie everything together.

XII. The Way Ahead

This will not be the first time the United States has attempted to deploy an operational anti-ballistic missile defense system, leading some individuals to ask whether "the third time will be the charm."[39] The chances that the current efforts will lead to a lasting missile defense capability will be enhanced by the fact that U.S.-Russian relations have successfully survived U.S. withdrawal from the ABM Treaty. Moreover, the United States faces a greater number of missile-armed and potentially hostile states than during the Cold War, even if it faces fewer numbers of long-range ballistic missiles overall. In addition, current missile defense systems benefit from advances in key technologies over the past 35 years and have a more modest objective than did earlier U.S. ABM systems, whose effectiveness was judged by how well they could defend against thousands of highly sophisticated Soviet ICBMs and submarine-launched ballistic missiles.

Ten years after the counterproliferation initiative was announced, the U.S. missile defense program has made solid technological and political strides. Yet its future is far from certain. Many elements of the American political spectrum oppose the effort that is being invested in missile defenses and highlight the treasure that a robust, working defensive shield will cost in the future. On the other hand, advocates of strategic and tactical missile defenses point out that the cost is less than the bill for strategic offensive weaponry in the Cold War and that this is a propitious time to move from a defense based on assured destruction to one based on defenses.

Given the concerns over stability during the Cold War, such a major shift in our strategic thinking then would have been unthinkable. But today a number of factors make such a change possible: Russia's change from adversary to partner; the rise of small, potentially undeterrable threats with WMD and the means to deliver them; and the increasing use of U.S. military power in an expeditionary mode, where it becomes vulnerable to localized missile attack. All of this makes a logical case for the development of missile defenses. To the degree it is possible, few would disagree that we need to shield our fighting forces and allies from missile strikes to the extent our technology and funding permit.

The Bush administration came into office in 2001 with a Republican majority in both houses of Congress and a mandate to deploy a missile defense system "as soon as technologically feasible."[40] They have begun to do just that, and their reelection in 2004 means that the deployments will continue. While the strategic defensive system they will initially field looks a lot like the National Missile Defense system of the Clinton years, there have been some notable improvements and changes.

For one thing, the initial 2004 deployment will not be an end point; rather, it will mark simply the first step in a long, evolutionary process of continuous improvements in what will become a layered defense of North America. Second, the concept of layering means that systems previously considered tactical (both for operational reasons and because of the classification restrictions of the ABM Treaty) will now be included in any U.S. missile defense system.

Third, the system will be deployed in stages or blocks, as noted above, using what the Pentagon is calling a "spiral development" model. In this concept, every move up the spiral requires additional testing and change. The system is not simply developed, fielded, and forgotten. Proponents point out that this way the United States can field something, which is "better than nothing." (More formally, it will "serve as a starting point for improved and expanded capabilities later.") Regular block improvements over the next ten years will continue to enhance the system's capabilities.[41]

Opponents argue that this is a recipe for continuing cost increases and unproven technology. Rather than procuring a system the way it has been done for the past fifty years, the spiral approach can lead to changed priorities, a shortened and relaxed testing schedule, premature deployment, and potentially an ineffective defense. According to this argument, "the Pentagon is ready to place the system on operational status even without the parts needed for it to be effective."[42]

XIII. Conclusion

The ideological nature of the debate over past deployment attempts in the George W. Bush administration was muted by the fact that missile defense proponents were running the White House and both houses of

Congress. The end of the ABM Treaty and the advocacy of proponents in all the key offices had, as one writer put it, "allowed the Missile Defense Agency to focus on developing a missile defense system without being whipsawed by high-stakes political fights." Furthermore, the September 2001 terrorist attacks "empowered the [P]resident on national security issues, reduced the public's focus on missile defense issues, and made opposing the [P]resident on defense programs tough."[43]

There has been both significant progress and important shortfalls in U.S. attempts to achieve viable theater and national ballistic missile defenses in the period from 1993 to 2004. Some of the major changes in this era include:

- There has been steady and significant progress in development and testing of theater missile systems, with relevant systems demonstrating improved capability. For example, the Patriot-3 TMD system is an improvement over the PAC-2 systems deployed in Desert Storm. Five other TMD systems are in various stages of research, development, testing and evaluation: THAAD, MEADS, ABL, and the two Navy Aegis-based systems.
- There has been a watershed change in U.S. attitudes on national missile defense issues. The election of President George W. Bush and his NMD supporters, the termination of the ABM Treaty, and the aftermath of the September 11, 2001, attacks on the U.S. homeland, along with the first deployment of NMD interceptors in 2004, probably means national missile defense is a non-reversible program.
- There has been a blurring of the distinction between NMD and TMD, partly due to technological changes, partly because of the mixing of the same technologies in both, and partly because TMD and NMD can now use technologies and architectures previously limited by the ABM Treaty.
- Spending on both TMD and NMD has increased dramatically under President Bush, to an estimated combined total of $10 billion in FY 2004, by far the largest portion of the U.S. counterproliferation budget.

- Despite the progress in ballistic missile defense, the United States is still years away from effective defenses against a robust threat in either national or theater defense.
- There has been little apparent progress in developing effective cruise missile defenses, a serious deficiency since these weapons are widely available to potential enemies, and provide a less expensive and probably more effective means of delivering biological munitions than are ballistic missiles. Indeed, far poorer states like Iran, North Korea, China and others, can present an emerging threat to U.S. personnel by combining this delivery system with the poor nation's most available and effective weapons of mass destruction.[44]

It is clear that more needs to be done to solve the ballistic and cruise missile threats that are emerging in the 21st century.

In addition to strategic missile defenses that defend the American homeland from small-scale attacks or accidental launch, the United States needs theater ballistic and cruise missile defense systems that are deployable, readily available to regional commanders, effective, proven, sustainable, survivable, and flexible.[45] The goal of theater missile defense should be more than simple protection for forward-deployed forces. It can also serve to strengthen the resolve of friends and allies, deter or dissuade an adversary from going to war, or from escalating a conflict already under way. In this regard, robust defenses can complement other efforts at peacekeeping that make the use of force less likely, including arms control and diplomacy, as well as offensive counterproliferation operations.

The future of missile defense systems for the United States in this, its latest attempt to deploy defenses, is now becoming clear. In coming years we can expect to see the creation of a layered defensive shield that begins with short-range, tactical defenses over our troops and allies in distant theaters. Additional layers will include sea-based interceptors and airborne lasers to attack missiles in their boost phase, and ground-based mid-course defenses that will track, target, and engage missile payloads during their flight. All these systems will be linked via a sophisticated battle management system that relies on terrestrial and space-based sensors. Given the political will, public support for deployment, and the

threats facing this country today, missile defenses are likely to play a central role in U.S. deterrence and counterproliferation policies over the coming decades.

Notes

1. William Perry, *Annual Report of the Secretary of Defense to the President and the Congress*, February 1993, 73.

2. Counterproliferation Program Review Committee, *Report on Activities and Programs for Countering Proliferation*, May 1995, 27; Counterproliferation Program Review Committee, *Report on Activities and Programs for Countering Proliferation and NBC Terrorism*, May 1997, tables 1.2 and 5.1.

3. See, for example, the arguments made in James Lindsay and Michael O'Hanlon, *Defending America* (Washington, DC: Brookings Institute, 2001).

4. For good short histories, see the following: Donald R. Baucom, "Ballistic Missile Defense: A Short History," Missile Defense Agency, July 2000. On-line, Internet, 11 June 2004, available from www.acq.osd.mil/bmdo/bmdolink/html/briefhis.html; Bradley Graham, "Back to the Future," in *Hit to Kill: The New Battle Over Shielding American From Missile Attack* (New York: Public Affairs Publishing, 2001); historical pages on the web site of the Federation of American Scientists at www.fas.org/spp/starwars/program; John E. Pike, Bruce G. Blair, and Stephen I. Schwartz, "Defending Against the Bomb," in *Atomic Audit* (Washington, D.C.: Brookings Institution Press, 1998), 269-326; Kerry M. Kartchner, "The Future of the Offense-Defense Relationship," in Jeffrey A. Larsen, ed., *Arms Control: Cooperative Defense in a Changing Environment* (Boulder, CO: Lynne Rienner Press, 2002); Michael Krepon, *Cooperative Threat Reduction, Missile Defense, and the Nuclear Future* (Washington, DC: Henry L. Stimson Center, 2003); Douglas C. Waller, "The Strategic Defense Initiative and Arms Control," in Richard Dean Burns, ed., *Encyclopedia of Arms Control and Disarmament*, Volume 2 (New York: Charles Scribner's Sons, 1993); "Strategic Defensive Arms Control: The ABM Treaty and Star Wars," in *Arms Control and National Security: An Introduction* (Washington, DC: Arms Control Association, 1989), 67-83; and Ivo Daalder, "Deployment Criteria for Strategic Defences," in *Strategic Defences in the 1990s* (New York: St. Martin's Press, 1990), 5-23.

5. The action-reaction dynamic was put forth in a famous speech by Secretary of Defense Robert McNamara in San Francisco, CA, in September 1967, during which he condemned the idea of strategic defenses because of their likely negative influence on international stability, and then with convoluted logic announced the deployment of Sentinel. See Department of State, *Bulletin*, 9 October 1967, 449, and Robert S. McNamara, *The Essence of Security: Reflections in Office* (New York: Harper & Row, 1968), 65.

6. U.S. Arms Control and Disarmament Agency, *Documents in Disarmament 1983* (Washington, D.C.: U.S. Government Printing Office, February 1986), 199-200.

7. Kerry M. Kartchner, *Negotiating START: Strategic Arms Reduction Talks and the Quest for Stability*, (New Brunswick: Transaction Books, 1992), 114-16, 241-43.

8. Highlights of Nitze's 1985 speech to the Philadelphia World Affairs Council found in Krepon, 94.

9. Donald R. Baucom, "Ballistic Missile Defense: A Brief History," *Office of the Undersecretary of Defense for Acquisition, Technology and Logistics website*. On-line, Internet, 14 April 2004, available from http://www.acq.osd.mil/bmdo/bmdolink/html/briefhis.html.

10. Most of these are anti-ship missiles (of 130 varieties, produced by 17 nations); some of these can be modified into land-attack variants. Thirteen nations have or are pursuing land-attack cruise missile capabilities. Barry Schneider, *Future War and Counterproliferation: U.S. Military Responses to NBC Proliferation Threats* (Westport, CT: Praeger, 1999), 119. See also Dennis M. Gormley, "UAVs and Cruise Missiles as Possible Terrorist Weapons," in James Clay Moltz, ed., *New Challenges in Missile Proliferation, Missile Defense, and Space Security*, Occasional Paper 12 (Monterey, CA: Center for Nonproliferation Studies, Monterey Institute of International Studies, July 2003), 3-9.

11. "Foreign Missile Developments and the Ballistic Missile Threat Through 2015, An Unclassified Summary of a National Intelligence Estimate," *National Intelligence Council*, December 2001. On-line, Internet, 5 January 04, available from www.odci.gov/nic/other_missile threat2001.html.

12. The National Intelligence Council has contained this statement in each annual report on ballistic missile proliferation since 1999.

13. *Ballistic and Cruise Missile Threat* (Wright-Patterson AFB, OH: National Air and Space Intelligence Center, August 2003), 22.

14. For a thorough discussion of the cruise missile threat, with special reference to their application as potential delivery vehicles for biological weapons, see See Rex R. Kiziah, "Assessment of the Emerging Biocruise Threat," *Future Warfare Series No. 6* (Maxwell AFB, AL: USAF Counterproliferation Center, Air War College, August 2000); and, Michael E. Dickey, "Biocruise: A Contemporary Threat," *Future Warfare Series No. 7* (Maxwell AFB, AL: USAF Counterproliferation Center, Air War College, September 2000).

15. Robert D. Walpole, National Intelligence Officer for Strategic and Nuclear Programs, "Statement for the Record to the Senate Subcommittee on International Security, Proliferation, and Federal Services, on the Ballistic Missile Threat to the United States," 9 February 2000. On-line, Internet, 5 January 2004, available from www.cia.gov/cia/public_affairs/speeches/2000/nio_speech_020900.html.

16. "Excerpts from the DCI National Intelligence Estimate: President's Summary," *The Brookings Institution*. On-line, Internet, 2 February 2004, available from www.brook.edu/dybdocroot/press/companion/defendingamerica/appendix_b.htm.

17. The unclassified version of the Gates Panel report is available at Federation of American Scientists website, 23 December 1996. On-line, Internet, 5 January 2004, available from www.fas.org/irp/threat/missile/oca961908.htm.

18. This conclusion was subsequently misinterpreted to imply that such a threat would materialize within five years of the Commission's report – that is, by 2003 – and, when such a threat did not materialize by that date, the Rumsfeld Commission was criticized on this basis. But that is an inaccurate reading of the report's conclusion. The report did not identify any specific date, but simply predicted the amount of time needed to produce a long-range missile should such a country make a decision to do so.

19. The unclassified Executive Summary of the Rumsfeld Commission Report is available at Federation of American Scientists website. On-line, Internet, 5 January 2004, available from www.fas.org/irp/threat/bm-threat.htm.

20. Ibid.

21. In a speech to the Carnegie Endowment for International Peace, National Intelligence Officer for Strategic and Nuclear Programs, Robert D. Walpole (senior official in charge of producing the missile threat NIEs) said: "Although the launch of the Taepo Dong 1 as a missile was expected for some time, its use as a space launch vehicle with a third stage was not." Central Intelligence Agency website. On-line, Internet, 5 January 2004, available from www.cia.gov/cia/public_affairs/speeches/1998/walpole_speech_091798.html, 6.

22. Walpole, "Statement for the Record to the Senate Subcommittee on International Security, Proliferation, and Federal Services, on the Ballistic Missile Threat to the United States."

23. The official unclassified summary is available at Director of Central Intelligence website. On-line, Internet, 5 January 2004, available from www.odci.gov/nic/other_missilethreat2001.html.

24. Ibid.

25. "Excerpts from the DCI National Intelligence Estimate: President's Summary," *The Brookings Institution*. On-line, Internet, 2 February 2004, available from www.brook.edu/dybdocroot/press/companion/defendingamerica/appendix_b.htm.

26. The specifics regarding individual weapons systems in this section comes from multiple sources, among them the following: Wade Boese, "Missile Defense, Post-ABM

Treaty: No System, No Arms Race," and "Factfile: U.S. Missile Defense Programs at a Glance," both in *Arms Control Today*, June 2003, 20-28; Theresa Hitchens, "Technical Hurdles in U.S. Missile Defense Agency Programs," in Moltz, 10-17; the *U.S. Missile Defense Agency website*. On-line, Internet, 5 January 2004, available from www.acq.osd.mil/bmdo/bmdolink/html (see especially their series of short *MDA In-Depth* fact sheets, published in July 2003, including "Ballistic Missile Threat Challenge" and The Ballistic Missile Defense System"); and the website of the *Federation of American Scientists*. On-line, Internet, 5 January 2004, available from www.fas.org.

27. Krepon, 128.

28. A good overview of theater missile defense can be found in Barry Schneider, "Theater Missile Defenses: Key to Future Operations," in his *Future War and Counterproliferation: US Military Responses to NBC Proliferation Threats* (Westport, CT: Praeger, 1999), 117-145.

29. This debate is best chronicled in Theodore A. Postol, "Lessons of the Gulf War Experience with Patriot," *International Security*, 16, 3 (Winter 1991/92), 119-71; and "Correspondence: Patriot Experience in the Gulf War," *International Security*, 17, 1 (Summer 1992), 199-240; See also Steven A. Hildreth, "Evaluation of U.S. Army Assessment of Patriot Anti-tactical Missile Effectiveness in the War Against Iraq," *Congressional Research Service*, 7 April 1992. Ironically, it was the so-called "arms control community" in the United States, whose members–such as Theodore Postol–were most critical of its failings as an anti-missile defense after the Gulf War, that lobbied to have Patriot's anti-missile defense characteristics "dumbed down" during its development period in the 1980s for fear of violating the ABM Treaty.

30. David E. Mosher, "The Budget Politics of Missile Defense," in Moltz, 19.

31. The White House, Office of the Press Secretary, "Remarks by the President on National Missile Defense," Gaston Hall, Georgetown University, Washington, D.C. 1 September 2000.

32. "Remarks by the President to Students and Faculty at National Defense University," The White House website, 1 May 2001. On-line, Internet, 5 January 2004, available from www.whitehouse.gov/ news/releases/2001/05/20010501-10.html.

33. For a good discussion of this timeline and the associated domestic pressures for an early decision to withdraw from the ABM Treaty, see Graham, *Hit-to-Kill*, 73-100.

34. "President Discusses National Missile Defense," The White House website, 12 December 2001. On-line, Internet, 5 January 2004, available from www.whitehouse.gov/ news/releases/2001/12/20011213-4.html.

35. "President Announces Progress in Missile Defense Capabilities," The White House website, 17 December 2002. On-line, Internet, 5 January 2004, available from www.whitehouse.gov/news/releases/2002/12/20021217.html.

36. "Missile Defense Operations Announcement," *U.S. Department of Defense News Release*, December 17, 2002. On-line, Internet, 5 January 2004, available from http://www.defenselink.mil/releases/2002/b12172002_bt642-02.html.

37. Rumsfeld quoted in Philip Coyle, "Rhetoric or Reality? Missile Defense Under Bush," *Arms Control Today*, May 2002, 3.

38. Bradley Graham, "U.S. Missile Defense Set to Get Early Start," *Washington Post*, 2 February 2004, A10.

39. This issue is addressed, for example, by Lindsay and O'Hanlon in *Defending America*, 7-16.

40. "National Missile Defense Act of 1999 (H.R. 4 ENR)," reprinted in James J. Wirtz and Jeffrey A. Larsen, eds. *Rockets' Red Glare: Missile Defenses and the Future of World Politics* (Boulder, CO: Westview Press, 2001), 324-325.

41. See Mosher, 20-21 in Moltz.

42. For one example of this argument, see Philip E. Coyle, "Is Missile Defense on Target?" *Arms Control Today*, October 2003, 7-14.

43. Mosher, 20 in Moltz.

44. Kiziah, "Assessment of the Emerging Biocruise Threat," and Dickey, "Biocruise: A Contemporary Threat."

45. For more on TMD requirements, see Schneider, 134.

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