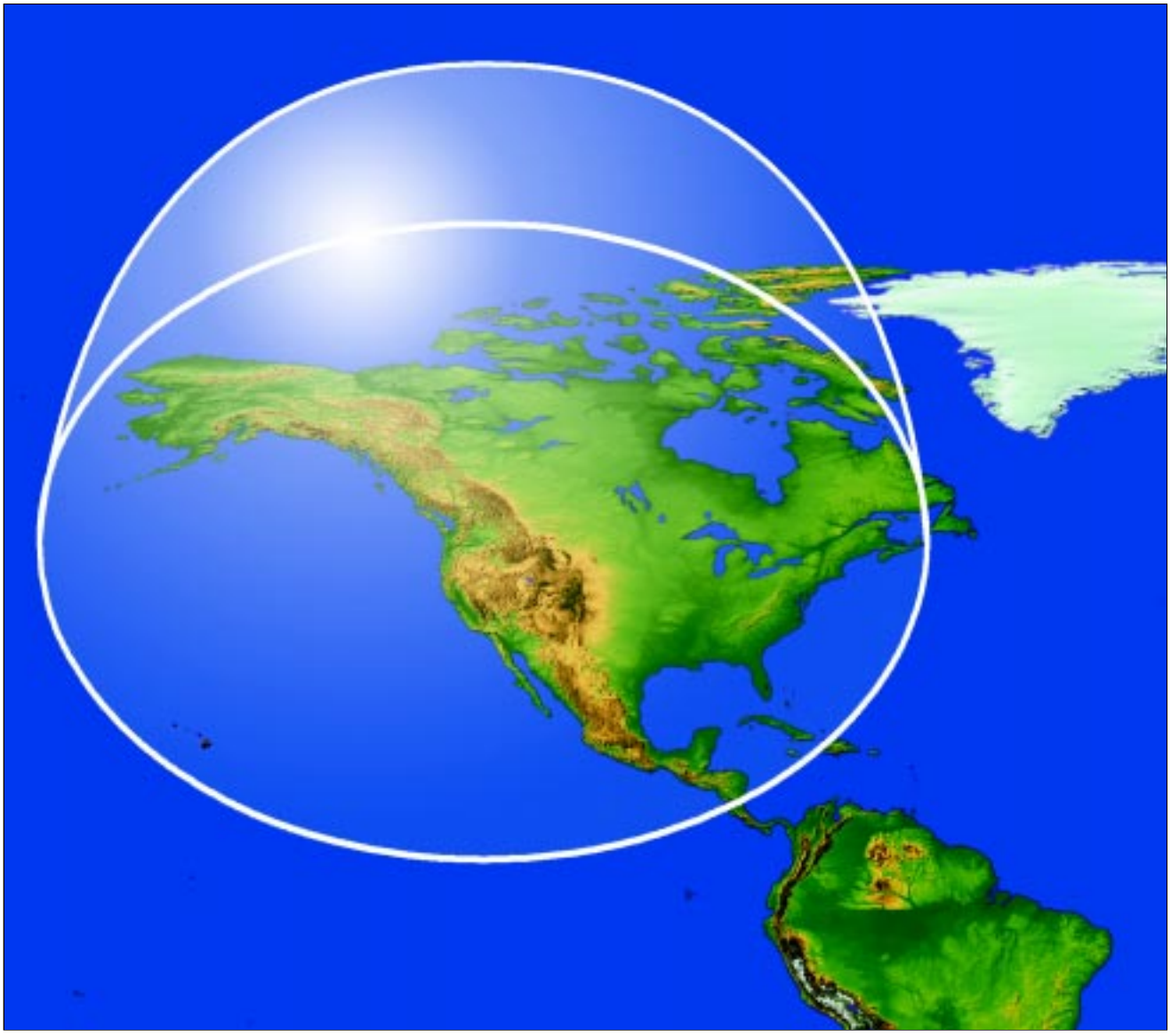
National Missile Defense
What Does It All Mean?

A CDI ISSUE BRIEF



CENTER FOR DEFENSE INFORMATION

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Center for Defense Information
1779 Massachusetts Avenue, NW
Washington, DC 20036
(202) 332-0600 • Fax: (202) 462-4559
www.cdi.org

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Contents

Foreword

THE FUTURE OF U.S. NATIONAL MISSILE DEFENSE remains in limbo at the time of this writing. We find ourselves in the midst of a presidential campaign in which defense programs often gain momentum from boosterism. At the same time, a string of missile interceptor failures has raised doubts about the feasibility of national missile defense to new heights. On September 1, 2000, President Clinton deferred NMD deployment, delaying—but not killing—the program.

Extensive press coverage of this politically charged program during an election year makes for a noisy dispute that the Center for Defense Information seeks to quell with a dispassionate survey of the potential costs and consequences of national missile defense.

This *Issue Brief* covers the four major desidarata that should, in a rational world, determine the decision on whether or not to build the NMD system. These key factors are cost, technical feasibility, the magnitude and timing of missile threats to America, and the political and strategic impact—especially on U.S. relations with its allies, Russia, and China. The reader of this primer will be able to draw his or her own informed conclusions about the worth of NMD in these terms.

BRUCE G. BLAIR
President

Washington, DC
September 2000

ONE

Why Should We Care?

By Rear Admiral Eugene J. Carroll, Jr., USN (Ret.), Vice President, Center for Defense Information

To an extent seldom seen since Cold War days, the growing debate over the need for a national missile defense (NMD) system has polarized public opinion. Pros and cons are put forward in increasingly strident confrontations, which lead not to understanding or accommodation but to divisive, emotional rejection of opposing views. What is there about NMD that produces heat—not light—when the issue arises?

It is because the decision to deploy an NMD system rests on the most fundamental issues of America's role in the world and our relationship not only with our adversaries but with our closest allies as well. It is not surprising that Russia and China are loud critics of NMD but Germany, France, Great Britain and other western nations are also questioning the wisdom of proceeding with a program that threatens to ignite a new nuclear arms race. It may be possible to shrug off the anticipated criticisms of countries often treated as enemies, but the United States must give thoughtful consideration and great weight to the same criticism from its friends.

President Clinton has said that a final decision to deploy NMD must await satisfactory answers to four criteria: 1) there must be a real threat; 2) we must have the technological means to address that threat effectively; 3) our response must be affordable; and 4) NMD deployment must not do unacceptable damage to the stability of current and future international security arrangements. All four of these criteria are evaluated in this issue brief, but the fourth is clearly the most critical. What good does a defense system do if it weakens the current strategic nuclear stability which rests on a hard-won arms control structure built over the last 30 years? Repeated U.S. threats to abrogate the Anti-Ballistic Missile (ABM) Treaty of 1972 ignore the truth that there is a comprehensive arms control structure within which the individual treaties are interdependent. The first Strategic Arms Limitation Treaty of 1972 (SALT I) was negotiated in tandem with the ABM Treaty as complementary measures, neither one possible without the other. Subsequently SALT II and the Strategic Arms Reduction Treaties (START I and II) were erected on the SALT I/ABM foundation.

The existence of this stabilizing arms control structure was recognized by other nations (most importantly by China) and thereby inhibited the expansion of other nuclear arsenals while contributing to global nuclear non-proliferation efforts. To pull out a keystone of arms control by abrogation of the ABM Treaty could weaken nuclear stability worldwide, particularly in the sensitive areas of Chinese, Indian and Pakistani nuclear programs.

Of equal concern is that NMD will certainly be a bar to progress on future arms control agreements, which are essential to achieve genuine reductions in still bloated nuclear arsenals.

President Jacques Chirac of France identified this problem when he declared: "Nuclear disarmament will be more difficult when powerful countries are developing new technologies [NMD] to enhance their nuclear capabilities." The great danger is that other nations, most notably China and Russia, will seek to enhance their own nuclear capabilities in response to the deployment of an American NMD system. In the political effort to justify deployment of defenses against a highly unlikely threat, the United States can undo significant arms control measures and end up facing much greater real nuclear dangers.

This is why all Americans should care deeply about the decision to deploy a national missile defense system. By such an action we will signal to the world that we are willing to pursue illusory defenses against non-existent threats even though we subject all nations to continued nuclear competition and increased risks of a future nuclear war.

TWO

A Brief History of "Missiles" and Ballistic Missile Defense

By Colonel Daniel Smith, USA (Ret.), Chief of Research, Center for Defense Information

The 1991 Persian Gulf War brought home a real sense of the damage ballistic missiles could inflict.

The "Missile" Threat Evolves

For most Americans, the Iraqi "Scuds" launched against Israel and the coalition forces in Saudi Arabia during the 1991 Persian Gulf War brought home for the first time a real sense of the damage that a distant enemy could inflict by employing ballistic missiles.

The first "ballistic" weapons probably were rocks that cavemen hurled at each other. These "missiles" were followed by sticks fitted with pointed stone heads to make spears and later by wood and "string" devices that propelled smaller wooden shafts through the air.

But it wasn't until catapults evolved that "missiles"—which could be anything from large flaming arrows (used by the Chinese in the 11th century) to large stones to a body (infected if possible)—became really useful in warfare. In the west, the Greeks set the early design standards for mechanical catapults, designs on which the Romans relied for their siege warfare machines.

The Chinese, who invented gunpowder, were also the first to employ explosives to power missiles and the first, in the 1300s, to fire a multi-stage missile. By the 17th century western military forces were experimenting with "war" rockets. Yet not until World War II were long range (up to 180 miles) rockets—the Nazi V-1—and ballistic missiles—the A-4, renamed the V-2—developed. Although it was possible to counter the noisy, relatively slow V-1, there was virtually no defense against the ballistic V-2.

As the wartime Allied coalition split, the new antagonists concentrated on developing long range intercontinental ballistic missiles (ICBMs) that could carry nuclear warheads. Strategic defenses were oriented more toward aircraft (with an estimated $200 billion spent between 1945–1961) rather than missiles for the simple reason that the technology for the latter was not available. Very early U.S. attempts at developing anti-missile missiles such as the short range hit-to-kill Thumper and the longer range Wizard were poorly funded and inconclusive.

Nonetheless, aware that the Soviets were pressing ahead with their missile developments, the Pentagon continued research on missile defenses. Then, on October 4, 1957, the Soviets launched into orbit the Sputnik satellite atop a multi-stage missile. A few weeks later the first U.S. attempt ended in disaster when the Vanguard rocket blew up on the launch pad. Not until January 1958, when a Pentagon ban on Army missile launches was lifted, did a U.S. Jupiter-C loft its Explorer I satellite into orbit. Both offensive and defensive long range missile development became priorities in a matter of a few weeks.

Anti-Ballistic Missile (ABM) Defenses: Part I (1958–1968)

Nike-Zeus was one of the first U.S. efforts whose objective was to develop long range defenses against ballistic missiles. The logic driving the program called for an exo-atmospheric (60 miles or higher above the earth's surface) or very high altitude, long range interceptor carrying a 400 kiloton nuclear warhead that, when detonated, would destroy incoming missiles.

While rocket science had put the concept within reach, the tracking radars were still too primitive to cope with a large number of missiles. The radars could be spoofed by countermeasures such as chaff and decoys, and were physically vulnerable. The tight defense budgets of the 1950s also acted as a restraint since a widely deployed system would be costly.

Overlapping the Nike-Zeus program was Project Defender, what today might be classed as an Advanced Technology Demonstrator program that explored possible new technologies that could be incorporated into future missile defense programs. One concept that emerged, called Ballistic Missile Boost Intercept (BAMBI), envisioned satellite launched, hit-to-kill missiles containing huge wire mesh arrays that would destroy offensive missiles in the first

five minutes (the "boost phase") of flight. Low funding and high projected costs, together with revised estimates of Soviet progress on offensive systems and doubts about the survivability of the BAMBI system, ended this effort in 1968.

Under President Kennedy, Nike-Zeus was canceled in 1961 and replaced by Nike-X. This program incorporated three major advances: a phased-array, electronically guided radar; a new short-range nuclear tipped interceptor called Sprint, and an upgraded Nike-Zeus missile renamed Spartan.

Nike-X, in turn, was superceded by Sentinel in 1967. Recognizing that the U.S. could not stop an all-out attack by Soviet ICBMs, the Johnson Administration elected to proceed with a "thin" anti-ballistic umbrella designed to protect major U.S. cities. When Secretary of Defense Robert McNamara announced the plan in September 1967, he made two points that have become part of the current debate about 21st century U.S. national missile defense: (1) attempts to deploy a comprehensive ABM system will only fuel the offensive missile race, and (2) what is needed is enough of an umbrella to counter very limited threats such as that posed by the small Communist Chinese ICBM fleet.

Anti-Ballistic Missile (ABM) Defenses: Part II (1969–1976)

The Nixon Administration refocused the Sentinel system from guarding cities to guarding vital military locations by employing as many as twelve ABM sites. Renamed Safeguard, the system would provide protection to Minuteman ICBM missile fields, Strategic Air Command bases, and the National Command Authority in Washington, DC. In August 1969 the Senate approved initial deployment on a tie vote broken by the Vice President. Critics of the program attributed the vote to two still familiar reasons: (1) U.S. approval to move ahead might be a useful card to have in the upcoming talks on limiting offensive systems (at that time the Strategic Arms Limitation Talks (SALT)), and (2) with the Soviets already well along with their own ABM system, no one wanted to be "soft on defense." Furthermore, the new Administration, like its predecessor, justified the "light ABM" deployment as a means of preventing the Chinese from ever using their emergent ICBM force to blackmail the United States.

In fact, SALT negotiations became entwined with separate talks on limiting anti-ballistic missile deployments. In 1972 the United States and the Soviet Union signed the ABM Treaty which limited both sides to two anti-ballistic missile interceptor sites. A 1974 Protocol reduced the two sites to one each and to 100 interceptors. The Soviets elected to defend Moscow with their nuclear tipped Galosh system (the upgraded "Gazelle" system is still in place today) while the United States opted to defend the Minuteman missile site around Grand Forks, North Dakota.

On October 1, 1975 the Grand Forks site became operational. The next day, the House of Representatives voted to close the system down because the Soviet program to put multiple independent reentry vehicles (MIRV) on their missiles meant that Safeguard would be easily overwhelmed. Furthermore, it was finally recognized that the radars that were part of the system would be blinded by the electromagnetic pulse from exploding nuclear warheads on the Safeguard interceptors. The Senate concurred with the House action in November, and in February 1976 the system went into "caretaker" status after only four months of operation. Except for its supporting radar, Safeguard was closed completely in 1978.

Anti-Ballistic Missile (ABM) Defenses: Part III (1983–2000)

This was the state of play when, on March 23, 1983, in five paragraphs near the end of a televised nationwide address, President Reagan conveyed his vision of how the U.S. could counter Soviet ICBMs by developing defenses that would make "nuclear weapons impotent and obsolete." Mr. Reagan conceded that some other nations might regard defensive measures "paired with offensive systems. . . as fostering an aggressive policy"—a concern that remains to this day.

Mr. Reagan conceded that some other nations might regard defensive measures "paired with offensive systems. . . as fostering an aggressive policy"—a concern that remains to this day.

Congressional charges that this futuristic "star wars" scheme was nothing more than another excuse to increase defense spending had little impact. The Strategic Defense Initiative (SDI) was born.

In 1985 the Pentagon's SDI Organization (SDIO) proposed a multi-layer, space-based system to defend 3,500 "targets" against Soviet missiles. By 1987 the reality of technological limitations had set in, and many anti-missile concepts were abandoned as unworkable. Nonetheless, with about $4 billion per year being spent on SDI, the program anticipated a deployment decision in 1993 and initial operational status by 1997 employing both ground and space-based interceptors.

When the Republicans gained control of both Houses of Congress in 1995, the stage was set for a major push not just for developing and deploying theater systems but for a National Missile Defense (NMD) system.

But by 1992 the Warsaw Pact had disintegrated and the Soviet Union imploded. Under President Bush, the idea of a nationwide defense against a massive Soviet missile strike was abandoned in favor of Global Protection Against Limited Strikes or GPALS. This envisioned an integrated system that would provide protection against tactical/theater missiles as well as up to 200 nuclear warheads mounted on land or sea launched intercontinental ballistic missiles.

But again outside events intervened. In the 1991 Persian Gulf War, America suffered its first combat casualties caused by ballistic missiles. Air Force and special operations missions to find and destroy Iraq's Scud missiles and their launchers met with no better success than the World War II effort (Operation Crossbow) to locate and hit the Nazi V-2 launch sites.

The one apparent bright spot came from initial reports that the Patriot Air Defense system had achieved notable success (a claim later modified substantially) in knocking out Scuds in their terminal ballistic phase. Congress responded by enacting the Missile Defense Act that specified deploying by 1996 a ground only system of interceptors to protect U.S. territory. The Pentagon, however, said that meeting the 1996 deadline was not possible, but deployment by 2002 was.

When the Clinton Administration came to power in 1993 SDIO became BMDO—the Ballistic Missile Defense Organization. Estimates that Iraq had been within 6 months of having a nuclear weapon with which it could have attacked its neighbors or used to blackmail the United States fueled the psychology of missile defense, particularly deployable theater defenses. When the Republicans gained control of both Houses of Congress in 1995, the stage was set for a major push not just for developing and deploying theater systems but for a National Missile Defense (NMD) system, to be deployed by 2003.

Technological setbacks caused this date to slip to 2005, which is also the year by which, according to a 1999 National Intelligence Estimate, North Korea could field a missile capable of hitting the U.S. homeland. But in late 1999 North Korea agreed to a moratorium on developing its Taepo Dong 2 ICBM, leading a number of analysts to add a year to the "threat development" time line. Concurrently, in mid-2000, retired Air Force General Larry Welch, the head of the National Missile Defense Independent Review Team created by the Pentagon to evaluate NMD, told the Senate Armed Services Committee that NMD's "high risk" made a 2005 deployment "unlikely."

On September 1, President Clinton announced his decision against authorizing the Pentagon to proceed with NMD deployment. He cited three major concerns:

- the status of technology (one hit in three tries);
- the refusal of Russia to agree to modify the Anti-Ballistic Missile Treaty to permit deployment of an NMD system; and
- the reluctance of our closest allies—especially those on whose territory early warning radars would be sited—to endorse NMD unless the Anti-Ballistic Missile Treaty were to be modified, thus preserving strategic nuclear stability.

The President reaffirmed that NMD is needed as part of a comprehensive national security strategy that considered all threats including terrorism and other means of delivering nuclear, chemical, and biological weapons. He said that his decision would not further delay the program as "experts" projected that the technology would not be ready for deployment before 2006 or 2007—allowing a delay in the deployment decision until Autumn 2001 or 2002, well into the term of the next president.

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THREE

The Ballistic Missile Threat

By Colonel Daniel Smith, USA (Ret.), Chief of Research, Center for Defense Information

Nation states, regardless of their basic ideology, define themselves in terms of "national interests." Traditionally, the most fundamental or vital national interest is the integrity of the territory of the state not only from dismemberment but also from direct attack by other nations.

Between 1815, the year in which the War of 1812 ended, and December 7, 1941, the day Japan struck Pearl Harbor, United States territory had not been attacked by an enemy military force. The Japanese air assault demonstrated that technology had irreversibly compromised the oceanic shield that had protected the United States over so much of its history, a new reality further confirmed by the development and use of long-range bombers and the first ballistic missiles during the war. With others now possessing the capability to mount attacks with little warning, the ability to determine hostile intentions has become even more important.

The Post-World War II Enemies Emerge

At the end of World War II, the cooperative effort that had succeeded in toppling Hitler began to crumble. Whereas the western powers largely demobilized, Stalin retained a huge military force. Countries that had been "liberated" by Soviet troops either disappeared as independent entities or were taken over by the communists. The 17 month stand-off over Berlin in 1947–48 confirmed for the United States that Stalin was bent on European domination, a plan being abetted by strong communist political movements in Greece, Italy, and France. Further, the acquisition of "the bomb" by the Soviets in 1949, years earlier than predicted, suddenly raised the stakes for U.S. national survival.

Meanwhile, at war's end in Asia, the line of division in Korea between Soviet and U.S. forces supervising the surrender of Japanese troops became a permanent dividing line between north and south. In 1949, Mao Zedong and his Chinese communists finally defeated their long-time enemy, Generalissimo Chiang Kai-shek, driving him and the remnants of his army and government onto Formosa (Taiwan). As the United States and a recovering Western Europe faced a new menace in Europe, a hot war began in Korea on June 25, 1950 as North Korean forces invaded an ill-prepared South. By August the South Korean army and U.S. soldiers and Marines who had been rushed to the peninsula were pinned into a small perimeter on the southeast part of Korea. The daring U.S. landing at Inchon broke the North Korean advantage, but by the end of the year the Chinese Communists entered the war in support of the North Koreans. Not until 1953 did an armistice take hold, one that to this day has never been replaced by a treaty of peace.

The Ballistic Missile Threat Emerges

The Soviet launch of Sputnik spurred the U.S. civilian and military space programs. For the military, the key step was combining warheads, missiles, inertial guidance, and command and control systems for both land-based and submarine launched systems. By 1960 the United States had achieved both options, with the Soviets close behind. Over the next 11 years, before the first arms limitation talks began, Moscow developed and fielded nearly 1,500 intercontinental ballistic missiles (ICBMs) with nuclear warheads. They also were working to develop a defense to intercept U.S. missiles, a project that eventually resulted in deployment of the nuclear tipped Galosh anti-ballistic missile (ABM) system.

While the Soviets had always been regarded as the primary threat to U.S. national survival, the Chinese Communists were developing capabilities of their own. In 1959, they exploded their first atomic bomb. Then, in 1964, the Chinese launched their first ICBM. While Beijing would never begin to match the

For the military, the key step was combining warheads, missiles, inertial guidance, and command and control systems for both land-based and submarine launched systems.

numbers of offensive missiles that the Soviets had—never fielding more than about 20–24 missiles and not achieving even a rudimentary submarine platform until the 1980s—the very existence of the Chinese force added another dimension to the missile threat to the United States.

Recognizing that anti-missile technology was such that the United States could not stop an all-out attack by Soviet ICBMs, the Pentagon during the Johnson Administration proceeded with development of a "thin" anti-ballistic umbrella designed to protect major U.S. cities.

In 1969, the Nixon Administration refocused the ABM system from guarding cities to guarding vital military locations, including Minuteman ICBM missile fields, Strategic Air Command bases, and the National Command Authority in Washington, DC. But this system was scrapped because it was too costly.

Where then, in the summer of 2000, does the long range missile threat to the U.S. stand? Russia, for all its problems, remains the only nation possessing enough ICBMs and submarine launched ballistic missiles (SLBMs) to overwhelm the proposed U.S. defensive umbrella. China continues to have only 20–24 ICBMs while its SLBMs are much shorter range. No other nation has operational ICBMs and only two—France and the UK—have SLBMs.

It was not until after Operation Desert Storm that missile threats from nations other than Russia and China took center stage in the thinking of American policy makers.

The Other "Threats"

While in the Asian arena both China and North Korea were viewed as hostile to the United States, two other regions produced "threats" to the United States. In the Americas, the success of the Cuban rebels under Fidel Castro and Che Guevara in toppling the American-supported Batista dictatorship earned U.S. hostility, culminating in the abortive 1961 Bay of Pigs invasion. In the Middle East, unstinting U.S. support for Israel in its conflicts with its neighbors earned the U.S. the enmity of a number of Arab states, most notably Egypt, Syria, Libya, and Iraq. As the Cold War developed, these nations all became clients of the Soviet Union which supplied all but Cuba with short range "Scud" surface-to-surface ballistic missiles. In 1979, with the fall of the Shah and the seizure of American embassy personnel in Tehran, Iran suddenly went from a close ally of the United States to an enemy. Moreover, Tehran began supporting terrorist organizations attacking Israel, taking Americans hostage, and blowing up the U.S. embassy and a Marine barracks in Lebanon. This turn of events resulted in a partial rapproachment with Iraq during the 1980-1988 Iran-Iraq War, including reestablishment of diplomatic relations. This conflict also saw the first mutual use of Scuds in the Middle East (Egypt had used Scuds against Israeli forces in 1973) with both sides being supplied by the USSR and North Korea.

By the time Iraq invaded Kuwait in August 1990, no major power supported Baghdad. In the ensuing war with the U.S.-led coalition Iraq employed Scud missiles against Israeli cities and coalition bases in Saudi Arabia, but its resupply pipeline was shut down. Only in the aftermath of the war did it become evident how far Saddam Hussein had progressed in pursuit of the goal of developing nuclear weapons and the means to deliver them.

It was not until after Operation Desert Storm that missile threats from nations other than Russia and China took center stage in the thinking of American policy makers. As Janne Nolan recounts in *An Elusive Consensus: Nuclear Weapons and American Security After the Cold War*, Les Aspin, Chairman of the House Armed Services Committee and soon to be Clinton's first Secretary of Defense, identified "regional" aggressors as the main threat to international peace. Mr. Aspin developed what Nolan describes as the Saddam Hussein "threat yardstick" by which all regional rogues could be measured: willing to commit aggression, pursuing nuclear weapons development, use of terrorism, and a totalitarian system of governance. Aspin found that Cuba, Syria, North Korea, Iran, Libya, and even China fit the mold, and were thus lumped together under the nondiscriminatory "rogue" moniker despite some profound differences.

Moreover, according to Nolan, Aspin was the one who suggested that, had Saddam Hussein succeeded in developing nuclear weapons and mating them to delivery systems capable of threatening key U.S. allies, America might have thought twice about mounting Desert Storm or at the least have been forced into different and more costly operations. "The notion that the United States would have been unable to assemble a credible military coalition to deter or defeat a nuclear-armed, or even a chemically armed, Iraq took hold and soon became conventional wisdom."

It is exactly this mindset that is driving the U.S. rush to develop a national missile defense (NMD) system. George Tenet, Director of the

Central Intelligence Agency, testified before Congress in February 2000 that "over the next 15 years, our cities will face ballistic missile threats from a variety of actors." He pointed specifically to North Korea which, he said, could test its Taepo Dong 2 missile this year, noting that it "might be capable of delivering a nuclear payload to the United States." The unstated assumption—although others are quite willing to articulate the point—is that traditional deterrence will not work on the rogues because they are led by unstable, irrational leaders who give no thought to their own survival when they make decisions. (In its own way this psychology mirrors the apparent belief among U.S. officials during the Cold War that the United States could emerge victorious from a nuclear conflict with the Soviet Union.) The United States invokes this belief when it tries to convince its European allies that America's willingness to meet threats to Europe will only be strengthened by deploying NMD.

If the rogue state hypothesis were not enough, the existence of even loosely affiliated sub-national actors hostile to U.S. dominance elevates the worry-factor exponentially. Yet against this threat an NMD system would be useless since the least likely mode of attack by terrorists is via an ICBM.

This constant rhetoric risks encouraging those who oppose U.S. dominance, initiatives, and world-wide presence, whether labeled rogues or not (since June 2000 the State Department has dropped this term and substituted the more flexible "states of concern"), to develop "asymmetrical" military means to challenge and even blackmail the United States. But the blackmail hypothesis comes into play only if leaders of other nations who might have or who acquire long range missiles are assumed to be so different from Russians and Chinese that they would act irrationally in the face of overwhelming U.S. conventional, let alone nuclear, force.

This psychology also assumes that nations will never change. Yet the United States has developed working relationships with North Korea that produced suspension of the North's nuclear weapons program and a moratorium on missile development. Engagement with Syria produced concrete (though still incomplete) advances in the overall Middle East peace process, and in the case of Cuba there has been cooperation on stemming refugee flows and interdicting drugs.

Recent National Intelligence Estimates and Other Reports

In September 1999 the Director of Central Intelligence released a new National Intelligence Estimate (NIE), "Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015." The key sentence in the NIE states: "We project that during the next 15 years the United States *most likely* will face ICBM threats from Russia, China, and North Korea, *probably* from Iran, and *possibly* from Iraq" [emphasis added]. The NIE also made a point that, Russia and China excepted, the ICBM-range missile threat from other nations will "probably [be] a few to tens, constrained to smaller payloads, and [be] less reliable and accurate."

This language returned the threat analysis to what has been the traditional approach of NIEs: what is *likely* to happen (probability) rather than the much broader criterion of what *could* happen (possibility), which was the emphasis of the 1998 Rumsfeld Commission report to Congress. (Nonetheless, influenced by the Rumsfeld approach, the NIE did discuss possibilities.) Although policy needs to consider possibilities, in a world of constrained resources in which hard choices must be made, the sensible course is to focus on probabilities.

A new NIE went to the President in August 2000. It is one of the numerous data sources the President considered in making his determination against authorizing the start of preparations for clearing the radar site on Shemya Island. Although still classified, the NIE undoubtedly remains quite cautious about North Korean capabilities. Nonetheless, some observers expect it will push to 2006 the projected earliest date for operational deployment of a North Korean ICBM capable of reaching the United States with a nuclear payload.

In the end, what many missile defense analysts believe would more likely produce the results the United States wants—a permanent end to the North's nuclear weapons program and cessation of missile development and export of missiles and missile technology—is sustained engagement with Pyongyang and its eventual integration into the community of nations.

With regard to Iran and Iraq, the September 1999 NIE suggests that Iran, with Russian help, *could* field a nuclear tipped ICBM able to hit the United States by 2010. However, the *probable* year that an ICBM-range missile will actually be

The existence of even loosely affiliated sub-national actors hostile to U.S. dominance elevates the worry-factor exponentially.

tested was put at either 2010 or 2015. Similarly, Iraq—with substantial help from North Korea—*possibly* could test an ICBM-range missile by 2010 but is as likely not to do so even by 2015.

It is easy to overlook why North Korea, Iran, and Iraq would pursue long-range missile developments. During the Cold War all three nations found themselves in armed conflict with the United States: North Korea in 1950–1953, Iran during the late 1980s when the United States was escorting oil tankers in the Persian Gulf (this was the period in which the USS *Vincennes* shot down an Iranian civilian airliner), and Iraq in the 1990–1991 Persian Gulf War and the subsequent air campaign enforcing the no-fly zones over northern and southern Iraq.

Rogues. . . view these weapons more as strategic tools of deterrence, coercive diplomacy, not as operational weapons of war.

In early May 2000, Robert Walpole, CIA National Intelligence Officer for Strategic and Nuclear Programs, gave a forthright assessment of the probable reasons these countries are pursuing missile programs: they "view these weapons more as strategic tools of deterrence, coercive diplomacy, not as operational weapons of war." But this suggests that the leaders of these nations are not irrational rogues bent on an unprovoked attack on the United States. In fact, they are just as susceptible, through persistent, hard diplomacy, to the influence of the community of states as are other nations.

Missile defense analysts also anticipate that the new NIE will include an evaluation of the political and military repercussions stemming from a U.S. decision to proceed with NMD. Among these could be:

- the probability that Russia and China will forge an agreement that will offset the U.S. NMD, perhaps involving more aid to North Korea's missile program or Iran's;
- the likelihood that China will not only modernize its existing ICBM fleet (which it seems intent on gradually doing) but will also enlarge it—possibly by putting multiple independent reentry vehicles (MIRVs) on its land-based ICBMs;
- the possibility that India, which considers China its main threat, may try to field an intermediate and long-range missile capability;
- the undoubted build-up of Pakistan's capability in reaction to India's efforts.

While both Pakistan and India have ballistic missile programs already, neither is considered even a long term threat to the United States.

Conclusions

- In summer 2000, only Russia possesses enough ICBMs and submarine launched ballistic missiles (SLBMs) to overwhelm the proposed U.S. defensive umbrella. China has only 20–24 ICBMs while its SLBMs are much shorter range.
- Not until after Operation Desert Storm did missile threats from nations other than Russia and China take center stage in the thinking of American policy makers.
- The term "rogue states" indiscriminately lumped together seven nations—Cuba, Syria, North Korea, Iran, Libya, Sudan, and Iraq—in U.S. foreign policy considerations. The unstated assumption is that traditional deterrence will not work on the rogues because they are led by unstable, irrational leaders.
- The CIA believes these countries "view these weapons [ICBMs] more as strategic tools of deterrence. . . not as operational weapons of war." But this suggests that the leaders of these nations are not irrational rogues but are just as susceptible to the influence of the community of states as are other nations.

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FOUR

Technological Challenges in National Missile Defense

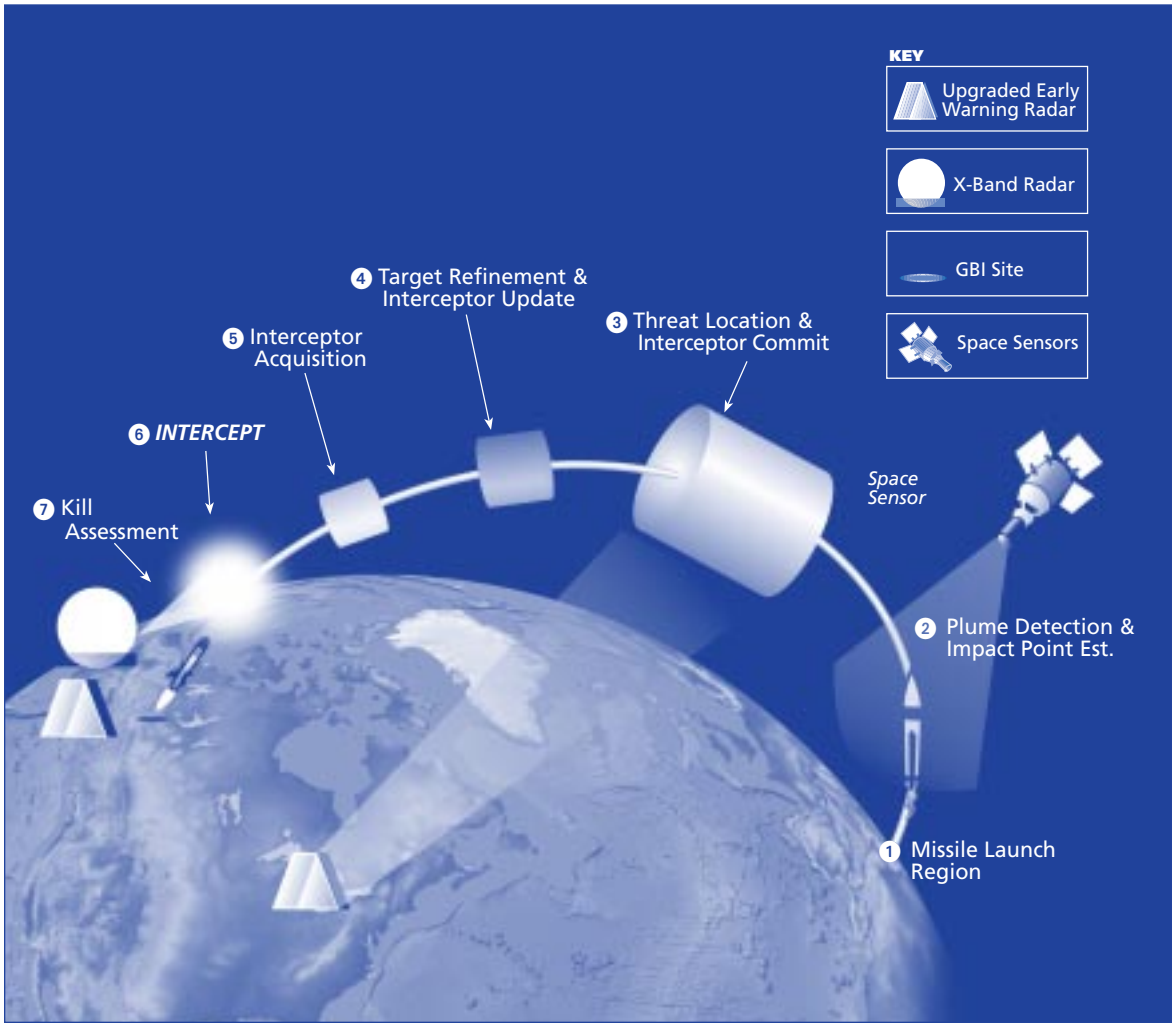
By Colonel Daniel Smith, USA (Ret.), Chief of Research, Center for Defense Information

The National Missile Defense (NMD) program is what the Pentagon calls a "system of systems." In NMD, necessary functions are distributed to different sites over vast distances linked by high speed data communications.

The NMD Systems

The NMD complex currently planned has six distinct parts, all of which must perform perfectly if the system is to succeed. These elements are:

1) The initial launch detection and tracking system that consists of the satellites of the Defense Support Program (DSP). The satellites are scheduled to be replaced starting in 2006 or 2007 by the Spaced Based InfraRed System-High (SBIRS-High) constellation of five (plus one in reserve) geosynchronous satellites.



2) Five ground-based early warning radars (including one each in the UK and Greenland) that receive the initial tracking data from DSP or SBIRS-High through the system's command and control network. These ultra-high frequency radars project the flight "envelope" of the hostile missile's trajectory. The five existing radars are to be upgraded to enhance their tracking capability, which in turn will improve the data available to plot intercept points.

3) Four but possibly as many as nine (including one each in the UK, Greenland, and South Korea) X-band (high frequency, short wavelength) radars whose function is to discriminate between incoming real warheads and decoys. The first of these for the NMD system is to be built on Shemya Island in the western Aleutian Islands of Alaska.

4) Interceptor booster, a modified three stage commercial "off-the-shelf" very fast rocket which carries the exoatmospheric kill vehicle (EKV) to close proximity of the planned intercept point. While in flight the EKV receives updated information on the changing location of the incoming missile and warheads/decoys and passes this information to the booster until separation.

5) Exoatmospheric kill vehicle, whose on-board computer processes updates on the location of the hostile missile after the EKV has separated from the booster. The EKV has a combined optical and infrared (multiple waveband) sensor on board through which it acquires, tracks, and discriminates its target. Using small thrusters, the EKV, which weighs 130 pounds and is 51 inches long, performs terminal maneuvers enabling it to strike the target and destroy it by kinetic energy. The combined closing speed of the target and the interceptor is some 15,000 miles per hour.

6) The Battle Management, Command, Control, and Communications (BMC3) network, the heart of NMD. It links the separate elements, receiving data; analyzing parameters such as speed, trajectory, and impact point of hostile warheads; calculates the optimum intercept point; cues and fires the interceptor; provides updated information to the booster and EKV; and assesses success and failure of the intercept and, if the latter, repeats the process with one or more additional interceptors. A critical sub-element of BMC3 is the In-Flight Interceptor Communications System (IFICS) through which information is sent to the interceptor as it flies toward the target. Five locations have been designated for six to twelve equipment sets, but more may be required.

A seventh element, a constellation of 24 low orbit SBIRS satellites that will improve launch detection and warhead-decoy discrimination, is to be added later. But in 1999 the Air Force canceled a $832 million contract to test models of SBIRS-Low because of software and sensor problems. The service now plans that the first 6 of the 24 satellites lofted into space in 2006 or 2007 will be "experimental."

(See Enclosure 1, "Notional Deployment Architectures" for the proposed locations of the components of each currently planned stage of NMD development.)

The Current Flight Test Record

In addition to a number of static ground tests of various components, there have been six actual Integrated Flight Tests (IFTs) since 1998.

1) IFT 1 (April 1998): The interceptor was incorrectly programmed and failed to lift off the launch pad.

2) IFT 1A (June 1998): A "fly-by" test to determine if the EKV could discriminate between decoys and target warheads. According to the Ballistic Missile Defense Organization (BMDO), nine decoys and one warhead were included in this test of the Boeing/TRW EKV, which BMDO judged a success. This finding has been disputed (see "Discrimination" below).

3) IFT 2 (April 1999): Another fly-by test using an EKV built by Raytheon. Again, nine decoys and one warhead were used, and again BMDO declared the test successful.

4) IFT 3 (October 2, 1999): After two delays, this first attempt to achieve actual intercept of the target by the EKV finally occurred. Only one warhead and one decoy were used. BMDO defines this configuration as the one that the Capability 1 NMD will be facing in 2005. No actual data derived from the sensors were sent to the interceptor during the test. Initially, the EKV homed in on the decoy, detecting the warhead only at the last moment and hitting it.

The combined closing speed of the target and the interceptor is some 15,000 miles per hour.

5) IFT 4 (January 18, 2000): In this test programmed information was relayed from the launch detection system through the BMC3 network to the intercept booster. Six seconds before planned impact the infrared sensor on the EKV malfunctioned due to a blockage in the sensor's cooling system and the EKV missed the target.

6) IFT 5 (July 7, 2000): For this test, also delayed twice, the IFICS of the BMC3 network was to provide guidance and final pointer information to the EKV after it had left the booster. The EKV failed to separate from the booster and its sensors were never activated. Another "low tech" failure occurred when the Mylar balloon decoy on the target rocket did not inflate. However, BMDO claimed that a prototype X-band radar at the test interceptor launch location "discriminated the mock warhead from all other objects, including the debris from an improperly inflated decoy balloon."

Of the four criteria—threat, cost, technological maturity, and arms control impacts—technology is the controlling variable.

Additional Planned Tests

Given past failures, the schedule for future tests is fluid. Tests that are particularly critical are:

- IFT 6 (January 2001): This is the back-up to IFT 5 in the event that test was so inconclusive that little or no useful data was obtained. Originally, it was set for October in order to provide one more test before the anticipated presidential decision on whether to proceed with the system as configured.
- IFT 8 (2001): For the first time an operational ground based interceptor booster rather than a surrogate booster will be tested.
- IFT 13 (2003): This will be the first test of a full scale production ground based interceptor (booster and EKV). This date must now be considered highly questionable.

In total, some 21 in-flight tests (including the two fly-bys) are scheduled before the 2005 deployment, but only 11 are scheduled to occur before the deployment decision in 2003.

With the setback caused by the failure of IFT 5, the Pentagon has delayed its planned summer Decision Readiness Review by Secretary of Defense William Cohen at least into September. This in turn will delay the Secretary's recommendation to the President on whether to proceed with deployment.

The Challenges

Of the four criteria President Clinton said would guide his decision on proceeding with an NMD system—threat, cost, technological maturity, and arms control impacts—technology is the controlling variable. U.S. political considerations have already "substantiated" the threat, with only the date at which North Korea achieves an operational long-range missile capability in question. (In 1994 the U.S. intelligence community estimated North Korea would test its Taepo-Dong 2 missile sometime in the mid to late 1990s; it has yet to be tested.) With the budget surpluses, only the ability of BMDO to apply the money being allocated seems to be preventing the addition of even larger sums. The Administration has said that should Russia not agree to modify the ABM Treaty, the United States will abrogate the Treaty in order to proceed with NMD deployment.

Technology is indeed proving to be a brake of sorts, and this even though the Pentagon changed from two to one the number of successful intercepts needed to recommend to the President that he approve deployment.

There is also an object lesson in terms of the causes of the failures. They have not been "rocket science" but mundane things: failure of the interceptor to fire because it was incorrectly programmed; a blockage in the cooling system for the infrared sensor on the EKV; the failure of the EKV to separate from the booster, a "staging" sequence used thousands of times since the beginning of the U.S. space program. Even the October 2, 1999 hit was not "clean" in that the EKV first detected and homed on the balloon decoy and only then found the mock warhead.

Discrimination: The Real Showstopper

"Discrimination"—the ability to distinguish real warheads from decoys—seems to be the most complex and controversial technological hurdle. The fundamental realities are twofold. First, the system has to confront an incoming missile whose purpose is to fool the interceptor into going after one of many relatively sophisticated decoys. Second, the general performance characteristics of the U.S. EKV—its sensor array and communications links—are known, which can make the task of fooling the EKV easier.

The current NMD system is focused on midcourse intercept of the incoming threat, which is

generally predicted to be a nuclear warhead. But should the hostile missile's payload consist of bomblets filled with biological or chemical agents, there would be too many "warheads" for the NMD defender to take out.

Even with a nuclear warhead, the discrimination task is formidable. The warhead could be enclosed in a Mylar balloon and be accompanied by a number of similar but empty balloons. Dr. Theodore Postol, a physicist at the Massachusetts Institute of Technology, strongly believes that in the almost complete vacuum of space the EKV would be incapable of distinguishing the real warhead from a fake. The EKV "sees" these objects only as light points and evaluates their "size, temperature, surface materials, and orientation in space." Dr. Postol says that the full data collected from the 10 object fly-by test (IFT 1A) showed that the "changing spatial orientation of the decoys and warheads. . . was nearly the same" and "fluctuated in a varied and totally unpredictable way." Thus there is "no fluctuating feature. . . that could be used to distinguish one object from the other." And Dr. Postol says that the EKV sensors, which are programmed to measure fluctuations in the intensity of light, first identified a partially inflated balloon as the target and then two other "benign" objects that were brighter than the actual mock warhead. Yet because of the combined closing speed of 15,000 miles per hour (approximately 4 miles per second), the EKV must make the correct choice relatively early. The following indicates how hard this may be, according to Dr. Postol:

- At 625 miles (1,000 kilometers) distance the EKV sensors have a resolution of between 488–975 feet (150–300 meters).
- At just over 6 miles out (10 kilometers) the resolution is still only 4.9–9.8 feet (1.5 to 3 meters).
- A warhead similar to the Mark 12A used on U.S. Minuteman missiles is only 6 feet (1.83 meters) long with a base of 22 inches.
- At 2–4.5 miles (3–6 kilometers) separation distance, the EKV has under a half second to maneuver before impact.

BMDO refutes Dr. Postol's analysis as it does the judgment that it cut the number of decoys to four and then to one for the intercept attempts in order to improve the chances for successful discrimination. (Dr. Philip Coyle, head of the Pentagon's Office of Operational Test and Evaluation, who is himself a frequent critic of NMD, has supported their denials that the early tests had been rigged.)

Dr. Postol is not the only expert who believes the Pentagon has not been forthcoming with information. Michael Munn, retired Lockheed chief scientist who worked on NMD and headed the teams that scored the hit-to-kill "successes" in 1984 and 1991,[1] recently said: "Discrimination looks easy when you do it on paper. But you get up there and you never see what you expect—the data never agree with the predictions. The only way to make it [the testing] work is to dumb it down. There's no other way."

General Ronald Kadish, the current Director of BMDO, relies on the most recent "Welch Report" to buttress his position that the best approach to NMD development is an incremental one: although "design discrimination capabilities are adequate to meet the *defined* C-1 [Capability 1] threat. . . more advanced decoy suites are likely to escalate the discrimination challenge" [emphasis added]. General Kadish told the Senate Armed Services Committee on June 29, 2000 that "should we choose to add the additional sophistication" the EKV can handle more sophisticated decoys.

General Kadish did acknowledge that the NMD program is on a high risk schedule as it has compressed the normal DoD acquisition cycle from the usual 15 or more years to 8 (1997–2005). But he also believes, in quoting the latest Welch Report, that "the technical capability is available to develop and field the limited system to meet the *defined* C-1 threat" consisting of unsophisticated countermeasures [emphasis added]. Considering that the "hit-to-kill" approach leaves no room for error, many regard this "defined" threat as defining away the problem.

"Discrimination looks easy when you do it on paper. But you never see what you expect—the data never agree with the predictions."

Sea-Based Boost Phase NMD

Since the discrimination problem seems the most contentious, many analysts, including former Secretaries of Defense John Deutch and Harold Brown and former Deputy Secretary of Defense John White, are pushing the development of a shipborne NMD system. The advantage claimed for a sea-based system is mobility—a ship can loiter off the coast of a threat nation ready to fire interceptors as soon as a launch is detected. This would theoretically catch a missile in its boost phase (which for offensive intercontinental missiles lasts between

two and five minutes) while the hostile missile is traveling at a relatively slow speed, presents a high infrared profile, and is well before any deployment of its warheads and decoys. The difficulties with a sea-based system are:

1) The ship must be properly positioned so that its intercept envelope overlaps the threat missile's flight envelope. Ships positioned off North Korea's coast, for instance, would have difficulty trying to knock down an ICBM launched from that country over the North Pole.
2) To be properly positioned for intercept, ships would be confined to a relatively small "box," making the vessel easier to locate and attack.
3) The ship's crew would have to be at continuous "battle stations" to ensure that a defensive strike during boost phase could be executed at any time. The option of frequently rotating ships would require a number of additional ships—probably three for every one on station—which would rapidly add to NMD costs.
4) A defensive missile will be "chasing" the threat missile rather than intercepting it, which means the NMD booster must have greater speed. Furthermore, it must be clear quickly that the missile being tracked by the Navy is hostile and not just an unannounced test or space vehicle.
5) In terms of current technology, the Standard Missile, the "weapon" element in the Navy's evolving theater missile defense system, is not robust enough to act as an NMD-class interceptor. Conversely, the land-based interceptor being developed is too large for the vertical launch tubes on Navy cruisers and destroyers; they could only fit in Trident launch tubes on Ohio-Class ballistic missile submarines.

Some NMD advocates have been calling for space-based lasers (SBL) for boost phase intercepts

Lasers as NMD Boost Phase Interceptors

Although currently planned as a defense against theater missiles, a second alternative being touted for NMD boost phase intercept is the Air Force's Airborne Laser (ABL). The program has been under pressure from Congress because of technical hurdles that stymied development for some time, and the Air Force has other, higher priorities. Again, mobility is a plus, but the laser must be powerful enough and sufficiently focused to burn into the ascending rocket from afar. Considering that the new Russian S-400 surface-to-air missile is predicted to have a range of some 250 miles, the ABL must be able to knock out an ascending missile from at least this "stand-off distance" to avoid being threatened by an adversary's air defense systems, including long range fighters. In March 2000 the Air Force said it had overcome the problem of optical turbulence that had been a major technological hurdle in laser development. As with the sea-based system, however, there are questions as to how many planes will be needed to provide defensive coverage 24 hours a day in times of tension.

The Air Force had planned to demonstrate the viability of the program with a "shoot down" of a target in 2003, but this schedule could be delayed from one to three years because of financial constraints. This in turn would delay equipping the seven modified Boeing 747s the Air Force had originally planned to field starting in 2007.

Looking further into the future—out to 2020—some NMD advocates have been calling for space-based lasers (SBL) for boost phase intercepts as part of a multi-tiered missile defense shield. Theoretically, lessons from the ABL program could be incorporated into a SBL. The ABL prototype uses a laser generated from a chemical base, which may not be as feasible for the projected SBL. Until mid-July 2000, studies on system architecture and designing a vehicle for possible testing in 2012 were underway. Then, in its latest future roadmap entitled "Global Vigilance, Reach and Power," the Air Force omitted references to a deployed SBL target date of 2020.

Conclusions

- The six complex NMD parts must perform perfectly as separate parts and then mesh perfectly if the system is to successfully intercept a hostile missile.
- Two of three attempts to intercept a mock intercontinental range missile have failed and the third was a "qualified" success. As a result, the future test schedule is very fluid.
- Technology is proving to be the brake on deployment. Discrimination—the ability to

distinguish real warheads from decoys—seems to be the most complex and controversial technological hurdle.

- Boost phase intercepts, while theoretically appealing as a solution to the discrimination problem, have a number of practical considerations that make this a questionable "solution."

NOTES

[1] The first test series of the "hit-to-kill" idea began on February 7, 1983, over a month before President Reagan's "Star Wars" speech. Of the four "Homing Overlay Experiments," only the fourth succeeded, but the General Accounting Office (GAO) later determined that the target had been heated so that the infrared sensor on the interceptor could "see" it. (See the entry for June 10, 1994 in the Chronology.) In the 1991 success of the Exoatmospheric Reentry Vehicle Intercept System (ERIS), the target had one decoy on each side. But GAO found that discrimination was not tested because the ERIS seeker had been programmed to go after the middle of the three objects.

SOURCES FOR FURTHER READING

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"National Missile Defense Independent Review Team Executive Summary," June 13, 2000.

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Michael Munn as quoted by William Broad, "A Missile Defense With Limits: The ABC's of the Clinton Plan," NY Times on the Web, June 30, 2000.

"Update on National Missile Defense Intercept Test," DoD News Release No. 393-00, July 8, 2000 <www.defenselink.mil/news/Jul2000/b07072000_bt393-00.html>

Notional Deployment Architectures

Architecture	Expanded C1	C2	C3
Initial Operational Capability (IOC)	2005/2007	2007	2010-2015
Cost (non-additive)	BMDO $25.6B; CBO $29.5B (1996-2015)	CBO $35.5B	CBO $59.1B*
Threat**	simple penetration aids	sophisticated penetration aids	
	5 ICBMs with 5 warheads + simple decoys	25 ICBMs w/25 warheads + simple decoys Or 5 ICBMs w/5 warheads + 20 credible decoys	50 ICBMs w/50 warheads + simple decoys Or 20 ICBMs w/20 warheads + 100 credible decoys
Ground Based Interceptors (GBI)	20/100 Alaska	100 Alaska	125 Alaska 125 Grand Forks ND
Upgraded Early Warning Radar (UEWR)	Beale CA Clear AK Cape Cod MA Fylingdales UK Thule Greenland	Beale Clear Cape Cod Fylingdales Thule	Beale Clear Cape Cod Fylingdales Thule
X-Band Radars	Shemya AK	Shemya Clear Fylingdales Thule	Shemya Clear Fylingdales Thule Beale Cape Cod Grand Forks Hawaii South Korea
Space Sensors	DSP (Defense Support Program) SBIRS-High	DSP SBIRS-High SBIRS-Low	SBIRS-High SBIRS-Low
In Flight Interceptor Communications System (IFICS)	Alaska Shemya AK Carabou ME	Alaska Shemya Carabou Munising MI	Alaska Shemya Carabou Munising Hawaii

* CBO cost includes 250 GBIs at 2 sites, 9 X-band radars, 6 UEWR, 5 SBIRS-High, and 24 SBIRS-Low. Without SBIRS-Low, the CBO estimate drops to $48.8 billion.

** Estimates derived from John Holum's "Talking Points."

ENCLOSURE 1

FIVE

The Costs of Ballistic Missile Defense

By Christopher Hellman, Senior Analyst, Center for Defense Information

Methodology

There is no simple way to estimate the cost of developing a national missile defense (NMD) system. A 1995 analysis by the Library of Congress' Congressional Research Service (CRS) makes the point eloquently: "The question of exactly how much has been spent on 'SDI' or missile defenses since its inception is controversial and problematic. Analysts do not all agree on what exactly to count and how to count it once identified."[1] For example, should money spent on the Nike and Safeguard systems which were designed to shoot down incoming missiles be counted? It is equally difficult to estimate the future costs of an NMD system, since it is uncertain what form the initial system will take and how it might later be expanded.

This section focuses on the costs of ballistic missile defense (BMD) programs since President Reagan's 1983 "Star Wars" speech. Although substantial sums were spent on BMD systems such as the Nike-X, Nike-Zeus and Safeguard systems prior to this date—the Brookings Institution's "Atomic Audit" places the cost of these three systems at $34 billion[2]—the idea of developing and deploying a system capable of protecting the entire United States against ballistic missile attack was not seriously considered prior to 1983.

Figures, unless otherwise noted, will be in current—or "then-year" dollars—which are not adjusted for inflation, in order to show actual expenditures rather than to compare the relative expenditures from one year to another.

Historical Costs of BMD/NMD Program

According to the 1995 CRS report, the Defense Department's official funding estimates for ballistic missile defenses for the period Fiscal Year (FY) 1984 through FY'94 of $32.6 billion were badly understated. CRS estimated the actual amount at $70.7 billion. This funding was for general research and development on a broad range of technologies, and not designated as funding for specific BMD systems.

In fact, NMD does not appear as a separate program until the FY'97 budget request. Between FY'93 and FY'00—the years covered by the Clinton Administration—NMD received $10.8 billion.[3]

Relative Cost Estimates of Selected NMD Systems

One of the factors which make it difficult to assign a dollar figure to NMD is uncertainty about how the system will look. The number and type of components, as well as the extent of the threat against which the system is designed to defend, have constantly evolved. Chart 1 gives a comparison of some of the most concrete system architectures, including the threat they are intended to meet, the components included in each system, and their costs. The systems range from the modest one envisioned in the Missile Defense Act of 1991, to the much more ambitious GPALS system advocated by the Bush Administration. *Note: this chart is representative, not inclusive.*

A "Limited" System

An April 2000 report by the Congressional Budget Office (CBO) puts the cost of the Clinton Administration's latest blueprint for a limited NMD system at nearly $60 billion.[4] The report looked at the costs of the various phases of NMD deployment from an initial system of 100 ground-based interceptors at one location to a more robust system with 250 ground-based interceptors at two locations. CBO estimated the cost of the initial system, known as Expanded Capability 1, at $29.5 billion, and of the larger, Expanded Capability 3 system at $48.8 billion. This figure does not include the costs of the SBIRS-Low satellite system, which CBO views as critical to the success of the current

Estimated Costs of Selected NMD Systems

	Missile Defense Act of 1991[1]	"3+3"[2]	"3+3"[3]	Global Protection Against Limited Strikes (GPALS)[4]	The National Security Revitalization Act of 1995 (H.R. 7)[5]	"Defend America" Act of 1996 (H.R. 3144/S. 1635)[6]
THREAT	Provide by 1996 a defense against very limited ballistic missile attacks	Defend all 50 states against a limited attack by a rogue state or an accidental launch	Defend all 50 states against a limited attack by a rogue state or an accidental launch	Defend against missiles of any range launched from any country at targets worldwide	Defend against a limited ballistic missile attack by a rogue state or an accidental launch	Defend all 50 states against a limited attack by a rogue state or an accidental launch, to be expanded over time to provide a layered defense
DEPLOYMENT	Initial deployment of 4 interceptors at the Grand Forks site, one Ground-Based Surveillance and Tracking (GSTS) rocket launched surveillance system, and one ground-based radar	100 interceptors at a single "treaty compliant" location, possibly augmented by the Space and Missile Tracking (SMTS) radar system	Initial deployment of 20 interceptors at Grand Forks with a ground-based radar, 5 upgraded early-warning radars, and 1 X-band radar. Upgraded to 100 interceptors and 12 SMTS satellites	TMD system and 500-1,000 land-based interceptors and/or 1,000-2,000 spaced-based interceptors	Up to 100 ground-based interceptors at a single site, a ground-based radar, a command and control center, and at least 28 "Brilliant Eyes" space-based sensors	300 ground-based interceptors at 3 sites, 500 space-based interceptors, and 20 space-based lasers
COST	$8–$15 billion	$10 billion, $15 billion with SMTS	$6 billion for 20 interceptors, $13 billion for upgraded system	$46 billion (FY'91)	$29 billion*	$31–$60 billion through 2010#

* CBO also estimated that if this system were expanded by adding five additional sites the cost would increase by $19 billion.

\# Does not include costs to operate and maintain the system. CBO later estimated these costs at $2 billion to $4 billion annually, depending on the system deployed. Based on CBO's reports, the Senate Budget Committee estimated that the cost to operate the systems envisioned under the "Defend America Act" from 1997 to 2030 would be between $47 billion and $124 billion.

Sources:

1. Report by the House Armed Services Committee Staff to Committee Vice Chairman Charles E. Bennett, September 3, 1991.
2. Deputy Secretary of Defense John P. White's letter to Representative John Spratt, June 5, 1996.
3. CBO letter to House National Security Committee Chairman Floyd Spence, June 3, 1996.
4. "Ballistic Missile Defense Deployment Options," Congressional Research Service, July 19, 1991.
5. CBO letter to Senator James Exon, Ranking Democrat, Senate Budget Committee, March 23, 1995.
6. CBO letter to House Armed Services Committee Chairman Floyd Spence, May 15, 1996, and Senate Armed Services Committee Chairman Strom Thurmond, May 17, 1996.

NMD program. Including the cost of the SBIRS-Low satellite system, CBO estimates the total cost of the Expanded Capability 3 system at $59.4 billion.

Conclusions

- A precise dollar figure for NMD remains elusive due to uncertainty about the final scope of the program and lack of agreement about which costs from earlier missile defense systems should be included.

Estimated Costs of a "Limited" NMD System

	Expanded Capability 1	Capability 2	Capability 3
THREAT	"Several tens" of incoming missiles with simple countermeasures	A "few" incoming missiles with sophisticated countermeasures (Fewer missiles than could be engaged by the Cabability 1 system)	"Several tens" of incoming missiles with sophisticated countermeasures
DEPLOYMENT	100 ground-based interceptors at a single Alaska location, 1 X-band radar, 5 upgraded early-warning radars and currently deployed early-warning satellites that are part of the Defense Support program, 4 SBIRS-High and 6 SBIRS-Low satellites	100 ground-based interceptors at a single Alaska location, 4 X-band radars, 5 upgraded early-warning radars, 5 SBIRS-High and 24 SBIRS-Low satellites	250 interceptors at two locations, one in Alaska, (the other likely at Grand Forks), 9 X-band radars, 6 upgraded early-warning radars, 5 SBIRS-High and 24 SBIRS-Low satellites
COST*	$29.5 billion through 2015 (DoD estimates $25.6 billion)	$35.6 billion through 2015	$48.8 billion through 2015

* **Note:** None of these cost estimates actually include the costs of the SBIRS-Low satellites. CBO believes that the SBIRS system will be deployed for other missions even if not as part of the NMD system. However, CBO also notes that the SBIRS satellites are critical to the NMD system. CBO estimates the cost of the SBIRS-Low system at $10.6 billion, bringing the total cost of the Expanded Capability 3 system to $59.4 billion.

Source: "Budgetary and Technical Implications of the Administration's Plan for National Missile Defense," Congressional Budget Office, April 2000.

- CDI calculates that since 1983 the Pentagon has spent $95 billion on BMD, and roughly $44 billion on NMD alone.
- The projected $60 billion cost of the Expanded Capability 3 system currently under development is likely a conservative one, given the history of delays and cost overruns in the various NMD and TMD development programs. This estimate does not take into account the cost of future expansion of the system to include the space-based components of the GPALS program.

NOTES

1 "Ballistic and Tactical Missile Defense: RDT&E Appropriations & Programs, FY 1984–FY 1994," the Congressional Research Service, August 1, 1995.

2 The "Atomic Audit" (The Brookings Institution, 1999) presents the cost of these three systems in constant 1996 dollars. A rough recalculation eliminating the effects of inflation places the cost of these systems at approximately $10 billion.

3 DoD's annual "Selected Acquisition Costs by Weapons Systems," FY'94 through FY'01.

4 "Budgetary and Technical Implications of the Administration's Plan for National Missile Defense," Congressional Budget Office, April 2000.

SIX

Impact of NMD on Russia, Nuclear Security

By Dr. Bruce Blair, President, Center for Defense Information

Russia today can barely cope with U.S. offensive power, let alone a combination of offense and defense.

The Russian Nuclear Arsenal: Broke and Broken

Russia's economic decline has taken a large toll on Russian security during the past decade. Its military cannot adequately perform the traditional missions that are essential to the country's security—air surveillance, defense of airspace, territorial defense against external invasion, border control, and maintenance of internal cohesion. The sole exception is nuclear deterrence, and even this mission is becoming more burdensome.

The nuclear mission is also becoming accident-prone as Russia's military crumbles and its nuclear control and early warning deteriorates. A brief litany of the afflictions that plague the Russian nuclear establishment begins with its physical deterioration. Surveillance satellites and radars are wearing out. Unable to replace them, Russia's early warning system is decaying as gaping holes develop and susceptibility to false alarms grows, as happened in 1995 when a peaceful scientific rocket launched by Norway set off an alarm in Russia that started a nuclear launch count-down.

The nuclear forces are rusting, breaking down, and not getting repaired. Budget shortages among other problems are preventing the submarines and mobile land rockets from dispersing into the sanctuaries of the oceans and forests. The Russian navy strains to keep one or two ballistic missile submarines out of a fleet of twenty six on patrol, and at times cannot keep any at sea. The Strategic Rocket Forces strain to disperse out of garrison into covert field locations a single regiment of mobile rockets, that is 9 missiles out of a force of 350. Russian bomber pilots receive only about twenty hours of flight training per year, compared to hundreds for their U.S. counterparts. Underground command posts are crumbling. Prestigious institutes—for example, the laboratories that design nuclear weapons, build the deep underground command posts, and engineer the communications links that would be used to send the "go code" to the strategic rockets—are virtually bankrupt and cannot properly troubleshoot the aging equipment they designed. Even the famous nuclear suitcases that accompany the President and other top authorities are reportedly falling into disrepair.

On the human front, hardship is evident in the living and working conditions of nuclear units. They suffer from housing and food shortages, pay arrears, extended duty shifts owing to manpower shortages, and "moonlighting" to make ends meet. The commander of the Strategic Rocket Forces recently disclosed that 80 percent of the families of his people live below the poverty line. The competence and integrity of the generals who lead them have also declined. Rank-and-file officers and enlisted people are demoralized and alienated from the state, which fails to support them adequately, and the society, which no longer holds them in high esteem. They are themselves less impressive individuals because the standards of quality for admission to the higher military academies have dropped substantially.

Russia's NMD Concerns: Is Moscow the Real Target?

Russia must now confront the theoretical possibility that a future U.S. national missile defense (NMD) system would be the straw that breaks the back of Russia's nuclear deterrent. Russia today can barely cope with U.S. offensive power, let alone a combination of offense and defense, a one-two punch they fear could deliver the knockout blow to their strategic forces.

The Pentagon argues that the NMD system is very limited and could protect only against a threat from a few dozen warheads, compared to the one to two thousand warheads that Russia

would posses under the proposed START III Treaty over the next decade and thereafter. Such an abundant force, the Clinton Administration argues, will give Russia "the certain ability to carry out an annihilating counterattack on the other side regardless of the conditions under which the war began."[1]

In reality, a surprise offensive U.S. strike could, under some conditions today, destroy all but a few tens of Russian warheads, and national control over those surviving weapons might be lost. In the event of such an attack on Russia, all the rest of its strategic forces would be vulnerable to quick destruction. The surviving weapons might consist of one submarine (48 warheads for a Delta III or 64 warheads for a Delta IV), and one regiment of SS-25 mobile land-based missiles (9 warheads). Depending on the effectiveness of U.S. anti-submarine operations against Russian boats (a routine activity still today), and depending on the extent of disruption of Russian command and communications, it is possible that a very small number of Russian warheads would be available to fire at targets in the United States, and that they could be neutralized by NMD.

In the future (2010-2015), the total size of the Russian force could easily drop below 500 warheads, in which case the protection afforded by a "very limited" U.S. NMD system would loom even larger in Russia's estimation. A few tens or even hundreds of deliverable Russian warheads is not an acceptable number of surviving weapons from a Russian standpoint, just as several hundred surviving U.S. weapons would not be acceptable to the United States. As a point of reference, the United States currently requires its strategic forces to be able to destroy in retaliation to Russian attack the vast majority of the nearly 3,000 targets assigned to them. (The number of targets in the U.S. strategic war plan actually grew by 20 percent over the past five years.) In other words, the United States must be able to deliver about 2,000 warheads in retaliation in order to perform the nuclear wartime mission to its satisfaction.

These calculations of Russia's vulnerability—shocking from Moscow's point of view—were nearly irrelevant as long as Russia credited the West with benign political intentions. This discount all but evaporated with NATO's war on Yugoslavia. The war jolted Russia into the realization that NATO could rally politically and militarily around an offensive assault on a sovereign state, and could act unilaterally outside U.N. auspices as well as the NATO-Russia Founding Act. For the Russian General Staff, the NATO campaign invoked their nightmare scenarios of rapid escalation to nuclear strikes spearheaded by decapitation sorties by undetectable U.S. cruise missiles and B-2 penetrating bombers. Every day Russian planners witnessed the pertinent delivery platforms in action, and they doubtlessly stewed over the fact that the nuclear versions of the air- and sea-launched U.S. cruise missiles had enough range to reach Moscow from Kosovo airspace and the Adriatic.

The heavy bombing punctured any Russian illusion, or Western pretense, that NATO is a strictly defensive alliance. It was a defining moment in Russia's perception of NATO's potential to turn on Russia, and within the precincts of conservative Russian military planning this watershed moment is resurrecting a number of threatening scenarios that had been previously shelved and perhaps repressed. Despite their implausibility from an American standpoint, these scenarios of concern to Russia range from Western military intervention in Chechnya, to NATO attacks on Russia's nuclear forces using smart conventional weapons, to U.S. nuclear strikes against the Russian homeland.

Moscow's Response: A Hair-Trigger Nuclear Alert

If Russia wants to overwhelm an NMD shield it must plan to launch massively and quickly in a crisis, either firing first or firing on warning from a deteriorating network of early warning satellites. Russia must get its forces off the ground before incoming U.S. missiles can strike them.

In response to NMD, the alert rates of missile submarines at sea and road-mobile rockets on land might be increased, and Russia's SS-18 force might increase its readiness to launch on warning, even if it means breaching the 1994 Clinton-Yeltsin de-targeting pact. In striving to ensure that its missile forces in silos and on dockside alert can get off the ground before incoming U.S. missiles can strike them, Russia might heighten the readiness of its early warning radars and nuclear command posts. Russia's increased emphasis upon such accident-prone quick launch options would be solidified if the United States deploys a national

If Russia wants to overwhelm an NMD shield it must plan to launch massively and quickly in a crisis.

missile defense in this decade. To deal with this new development, Russia would likely deploy multiple warheads on its new land-based Topol M strategic missile, and might consider extreme responses including the fielding of space mines designed to disable the NMD's space-based sensor system in the event of U.S.-Russian hostilities.

U.S. officials point to Russia's hair-trigger readiness to launch on warning and to its perpetuation under START III as grounds for the Russians' confidence that they could mount an annihilating counterattack that would overwhelm American missile defenses. However, Russia's alert posture actually represents a bad thing because it runs the risk of mistaken or unauthorized Russian launch. The decay of the Russian nuclear arsenal has already eroded its safety and safeguards, along with its basic offensive capability. Progressive nuclear deterioration in Russia increases the risks of mistaken, illicit, or accidental launch and of the loss of strict control over Russia's vast nuclear complex. For example, a degraded early warning network loses some of its ability to detect an actual attack, but it simultaneously loses some of its ability to screen out false indications of attack generated by the sensor network. A broken communications link may delay the transmission of a legal launch order, but it may also degrade safeguards against an illegal launch.

Disruption of U.S.-Russian relations and of strategic stability might be avoided if fully offsetting reductions in offensive forces are made.

Resolving the NMD Conundrum: Offensive Weapons Cuts

American officials dismiss Russia's suspicions of NMD as unwarranted on the grounds that U.S. defenses are not aimed at Russia at all, except for possible scenarios of accidental Russian launches. But Americans cannot dictate Russian perceptions. Russian suspicions, while perhaps unfounded, are understandable in the light of recent setbacks in U.S.-Russian relations and of statements such as the following taken from a 1995 analysis prepared for Congress by the Pentagon's BMDO: Defenses against the Former Soviet Union ballistic missile threat ". . .could augment deterrence by significantly increasing the Soviet planners' doubts that any military attack on the United States could succeed."[2]

These Russian planners' worries include doubts about their ability to respond at all to an American attack. They fear that the combination of U.S. offensive firepower and a defensive shield could eviscerate their deterrent force and demolish the stability of U.S.-Russian nuclear relations.

While fielding a U.S. missile defense could redound to our grave disadvantage, disruption of U.S.-Russian relations and of strategic stability might be avoided if fully offsetting reductions in offensive forces are made. If severe constraints on offensive firepower are imposed then missile defenses may be tolerable, and in fact in theory stability could even be strengthened. One promising formula for striking a stable balance between offense and defense is to cut deeply the offensive missile arsenals and take all silo-busting U.S. warheads off alert and put them in long-term storage. By de-alerting most or all of the current 2,200 U.S weapons on high alert, a U.S. national missile defense would appear far less threatening to Russia. Russian strategic missiles would be far less vulnerable to sudden U.S. offensive forces, and thus they would be far more capable of overwhelming U.S. defenses. Russia in fact would be able to de-alert its own strategic missiles and thereby greatly reduce the risk of a mistaken or unauthorized Russian missile attack.

Unfortunately, neither country is presently pursuing this formula. We have instead embarked on a collision course with Russia that threatens to increase, not decrease, the nuclear peril to Americans.

Conclusions

- Russia views the NMD program as a real threat to its nuclear deterrent forces and thus to its national security.
- Russia will respond to NMD deployment in ways that increase U.S.-Russian nuclear tensions and the risk of accidental nuclear launch.
- NMD will increase the net nuclear threat to the United States. The additional danger of an accidental Russian launch will outweigh the additional protection from "rogue" state missile attacks that NMD might provide.

NOTES

[1] "Talking Points," *The Bulletin of Atomic Scientists*, <www.thebulletin.org>

[2] "National Missile Defense Options," Ballistic Missile Defense Organization, July 31, 1995, p. 1.

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SEVEN

U.S. National Missile Defense: Views from Asia

By Dr. Nicholas Berry, Senior Analyst, Center for Defense Information

The attitudes of Asian governments toward the national missile defense (NMD) program vary in direct relation to their ties with the United States. The closer the relations, the greater the support for missile defense. America's friends—Taiwan, South Korea, and Japan—see NMD linked to their own theater missile defense (TMD) systems against potential adversaries, adversaries they believe also concern the United States. Their TMDs could be integrated into NMD's early-warning and command and control satellites. Those countries identified as potential adversaries, principally North Korea and China, oppose U.S.-sponsored missile defense, whether labeled theater or national—and they see the connection between the TMDs of America's friends and NMD. In the middle are India and Pakistan. Both see some positive, but mostly negative, effects of NMD on their security.

The following review of views from Asia on U.S. NMD proceeds from the most hostile to the most supportive. Each country's national interests are first outlined and then the country's foreign policy concerning missile defense is presented.

China would feel compelled to counter the deployment of a NMD system by expanding and accelerating development of sophisticated intercontinental ballistic missiles (ICBMs).

China

National Interests. Most American analysts agree that China's priority is economic development. According to the Pentagon's June 2000 report to Congress on Chinese military power, "Beijing places top priority on efforts to promote rapid and sustained economic growth, to raise technological levels in sciences and industry, to explore and develop China's land- and sea-based national resources, and to secure China's access to global resources."[1] Beijing couldn't have expressed it better. In the global age, the economy is seen by Chinese leadership as the main ingredient in what they call "comprehensive national power."[2] The lack of economic strength, Beijing believes, only leads to bad consequences: the ruling party loses legitimacy, society suffers instability, military weakness increases, and, most importantly, foreign powers can intimidate, blackmail, and thus humiliate China. Close behind in second place and supported by China's prime national interest is sovereignty and territorial integrity. China believes, for economic, historic, and nationalistic reasons, that it must be united. Nationalism has replaced communism as the glue connecting the regime with society. Regaining Hong Kong in 1997 and Macao in 1999 left only Taiwan, the main prize, to be reunited with the mainland. Independence for Taiwan will not be tolerated.[3] Third among the top national interests is the yearning for China to be a major power, not in the sense of classic imperialism, but in the sense of an autonomous world player secure on what it calls its periphery. Globally, China favors a "multipolar" system not dominated by a single power such as the United States , with the UN Security Council—where China has a veto—acting as the clearinghouse for international disputes.[4]

Reaction to NMD. NMD would negatively affect China's first and third national interests; economic development and status as a world power in a multipolar system. A U.S. TMD system supplied to Taiwan would crush China's second national interest—reunification with Taiwan—and compel Chinese leadership to elevate this national priority to first place, albeit with great reluctance.

China would feel compelled to counter the deployment of a NMD system by expanding and accelerating development of sophisticated intercontinental ballistic missiles (ICBMs), thus retarding the country's economic development. A chorus of Chinese officials speak of "a spiraling arms race."[5] The Chinese would have to increase their military budget, sapping their investments in education, technology, and infrastructure—the prime domestic movers of economic modernization. They would have to take a more confrontational stance against what

they perceive to be a growing American security threat, risking the imposition of U.S. economic sanctions that would diminish American technology transfers, direct investment, and market access—the prime international movers of economic modernization. Given its pending integration into the global economy via the World Trade Organization (WTO), China would prefer not to take these actions.

NMD would also upset China's desire to be a major autonomous player secure on its periphery in a multipolar world. NMD would increase American military power enormously. In interviews and official statements, Chinese leaders categorically state that "U.S. missile defense would upset the world's strategic balance" and, with the abrogation of the 1972 Anti-Ballistic Missile (ABM) Treaty, would "shatter the basis of nuclear non-proliferation."[6] They have joined with Russian leaders in repeating this position, most recently in the communiqué after Presidents Jiang Zemin's and Vladimir Putin's July 2000 summit in Beijing. In their joint statement, the two leaders charged the United States with "seeking unilateral military and security advantages."[7] Even a limited NMD with 100 interceptors would neutralize China's twenty or so old, liquid-fueled DF-5 ICBMs, negating China's minimal deterrent capability. Its mobile, solid-fueled, 6,500 nautical mile DF-41 ICBM is still in development and it may be five or more years before it can be deployed in any numbers. NMD and DF-41 could be in a race to be operational first.

Although U.S. officials universally declare that NMD would be directed at threats from North Korea and Iran, most if not all Chinese analysts believe the U.S. missile defense program is directed at China. "Even if the United States says the system is not aimed at China," said Shen Dingli, an arms control expert at Shanghai's Fudan University, "the capability is aimed at China."[8] America is seen as trying to maintain world hegemony and dominate East Asia by containing a rising China.

What few Chinese mention—because it is not to their liking—is that an America that could intimidate and employ nuclear blackmail against China (as happened in order to end the Korean War and the two Quemoy and Matsu off-shore island crises in the 1950s) could force China into a de facto alliance with Russia. China wants to be autonomous for numerous reasons: cultural singularity, latent xenophobia, and as a go-it-alone expression of the world's most populated, historic Middle Kingdom. Alliances have never sat well with China, whether it was with the United States during World War II or with Russia in the early years of the Cold War. Nevertheless, China has indicated more than once that NMD would push it into a strategic partnership with Russia, thereby threatening the revival of the Cold War.[9]

But NMD is not potentially the most threatening missile defense system to China. Instead, it is a U.S.-supplied TMD system for Taiwan that could be linked to NMD's early-warning satellites and communication links. The Jiang-Putin joint communique explicitly warned against this TMD-NMD link: "The incorporation of Taiwan into any foreign missile defense system is unacceptable and will seriously undermine regional stability."[10] U.S. arms control advisor John Holum dismayed Chinese officials during his July 2000 talks in Beijing by stating: "We don't rule out the possibility that some time in the future Taiwan may have TMD capabilities."[11] If supplied and linked to U.S. missile defenses, China's number two national interest would become number one. As one Chinese diplomat explained, giving TMD to Taiwan "would be a direct interference with Chinese sovereignty and would have the most severe effects."[12] Chinese officials quite rationally believe that providing TMD to Taiwan would "forge a de facto military alliance with Taiwan," thereby committing Washington to defend Taiwan. As China's foreign minister Tang Jiaxuan told Secretary Albright during her June visit to Beijing, this would violate "the principles enshrined in the three Sino-U.S. communiques," fail to "respect [China's] sovereignty and territorial integrity," and make "the Taiwan issue. . . the most important and sensitive issue in the Sino-U.S. relations."[13]

What Chinese leaders fear most is U.S. backing for Taiwan's independence. "TMD in Taiwan," said China's chief arms control official, Sha Zukang at a Washington conference last year, "will give the pro-independence forces in Taiwan a sense of security, which may incite them to reckless moves [such as declaring independence]."[14] Beijing's February 2000 White Paper reiterated that formal U.S. military ties with Taiwan might result in Beijing's use of armed force. In effect, if push came to shove, Beijing would be obliged to downgrade economic modernization as it upgraded the sanctity of the one-China principle. As the recent Pentagon report on Chinese military power stated: "Some in China are aware that a

Even a limited NMD with 100 interceptors would neutralize China's twenty or so old, liquid-fueled DF-5 ICBMs, negating China's minimal deterrent capability.

war with Taiwan could be economically and politically devastating."[15] Yet, the sacrifice would more than likely be made.

Privately, Chinese diplomats and military officials concede that U.S.-sponsored TMD for Japan and South Korea, although certainly not welcomed in Beijing, would be different from supplying the same system to Taiwan. "Japan and South Korea, unlike Taiwan, are sovereign," one Chinese official noted, "and so we would have serious but less concern with such a situation."[16]

What Chinese officials of all stripes cannot understand is why the United States is willing to jeopardize secure relations with China not only by deploying NMD but even by considering supplying TMD to Taiwan. They have great difficulty believing that Washington sincerely believes that North Korea endangers American security and that it cannot be deterred. "A huge superpower and you say you're afraid of tiny little North Korea?" exclaimed Sha Zukang in a recent interview. "We think that's ridiculous."[17] Still, Beijing, along with Moscow, continues to urge Pyongyang to drop its ICBM program entirely in order to undercut U.S. voices favoring NMD. In July 2000, Russia—with Chinese approval—secured a pledge from North Korea not to continue its missile program if it could receive foreign assistance with its satellite launches for "peaceful space research."[18] In the meantime, Chinese officials skillfully propagandize to a largely sympathetic world against U.S. missile defense systems by pointing out the dire consequences if they are deployed. China and Belarus co-sponsored a Russian resolution in the UN General Assembly calling "on the states parties to preserve and strengthen the ABM Treaty" and condemning NMD as destabilizing and spurring an arms race; on November 5, 1999 it passed 54 to 4 with 73 abstentions.

The DPRK does not like to be labeled a rogue, a state sponsor of terrorism, or designated as a rationale for NMD.

The Democratic People's Republic of Korea

National Interests. Some confusion, even mystery, surrounds the true nature of the Democratic People's Republic of Korea's (DPRK) national interests. Most analysts would identify the same top three, but the order would vary. Evidence points to regime survival as the DPRK's top national interest. Just days after the June 2000 North-South summit, which was largely symbolic and loaded with goodwill, Chairman Kim Jong Il broadcasted to his Northern brethren a strong indication of his priority: "We must create a self-sufficient and strong nation and not yield to economic reforms and market openings that would certainly lead to our destruction."[19] The "our" clearly referred to his communist regime, as Kim undoubtedly had in mind how desire for economic changes undermined communist governments in the Soviet Union and Eastern Europe. Perhaps because it is an immediate concern, gaining foreign aid—mainly in the form of food and energy supplies—would be the second-priority national interest. Some estimates put the Northern death toll from starvation at two million over the past four years. A mix of closely related interests follow from the first two. North Korea wants to open relations with the world, command its attention and gain assistance, and create an image of itself as representing true Korean nationalism in order to win the struggle with the South over political control of an eventually reunified Korea. This mix is a long-term interest and is predicated on achieving the first two.

Reaction to NMD. NMD receives harsh criticism from Pyongyang. The DPRK neither appreciates being NMD's target, nor does it applaud America's attempt to pressure South Korea to develop a TMD, although not without some dilemmas. The DPRK does not like to be labeled a rogue, a state sponsor of terrorism, or designated as a rationale for NMD. In addition, the closer that U.S.-South Korean military ties grow, the greater the confidence given to the Southern government, backstopped by American might, to push for reunification on its terms and under its leadership. All this threatens the North's interest in staying in power and eventually lead a unified Korea. However, the closer the U.S.-South Korean relationship becomes, the more the North can accuse Seoul of being a puppet of the United States and win the struggle to represent the Korean nation. U.S.-South Korean ties also allow the North to highlight the threat from the South and use it to maintain its iron grip on the North.

Further cross-pressuring the North is the strange fact that NMD gives the North diplomatic leverage. If NMD is designed to neutralize the North's Taepo Dong-2, the mere possession of this missile allows the North to agree to a moratorium on its testing in return for aid and the lifting of U.S. economic sanctions. The DPRK successfully made such a deal after negotiations in Berlin in September 1999. Four months later, the North Korean Foreign Affairs

Ministry proudly admitted that its moratorium on missile tests was designed "to create a favorable atmosphere for the negotiations." And the leverage remains. On January 29, 2000, North Korean radio aired a warning following a U.S. NMD test: "Our moratorium. . . can be reconsidered depending on the U.S. attitude. . . . We will make an appropriate decision on the issue of bilateral relations, including the moratorium on the missile test-fire, while closely watching the U.S. attitude."[20] The DPRK's future diplomatic agenda seeks "to gain the withdrawal of American troops from the Korean peninsula and to thwart Washington's plans to deploy national missile defenses."[21] North Korean officials also added they will act to prevent the United States from embarking "on the dangerous road of a new round of arms race" by helping Japan develop a TMD.

The DPRK , in a late report, seemingly reversed its stand and agreed to a U.S. troop presence in the South, further adding to the uncertainty about its strategy.

India

National Interests. India's national interests have moved towards conservative realism under the Bharatiya Janata Party (BJP) coalition-led government of A. B. Vajpayee, following years of idealism under various Congress Party leaders. Economic development with global integration top the list of national interests. Satisfying this national interest energizes, enlarges, and rewards the bourgeoning Indian middle class—and keeps the BJP in power. India has opened up to direct foreign investment (U.S. investment, for example, rose from $72 million in 1991 to $3.4 billion in 1997) and pushed domestic technology to the point that it has become a world center for computer applications. With foreign policy an increasing concern for Indian officials, a growing interest in a stable and secure world order has emerged as the second national priority. This includes stability in world trade and finance, and regional and global balances of power and mutual deterrence. Indian officials see China and then Pakistan as national security problem areas, where border disputes with these states have nurtured traditional rivalries. Third, it follows that a growing economy and an expanded world outlook would feed a national interest in becoming an Asian regional power with a seat on the UN Security Council.

Reaction to NMD. NMD had little impact on Indian national interests until recently, and even now few comments emerge from New Delhi.

Three factors have increased India's awareness of the U.S. missile defense program. First, China's warnings that it would increase its strategic missile capability would put pressure on India to do the same in order to maintain its minimum deterrence. India realizes that to do so would also induce Pakistan to bolster its missile and nuclear programs in conjunction with Islamabad's traditional military relationship with rival China. This fallout from NMD, therefore, has already adversely affected India's prime national interest by adding pressure for higher military spending (already up 28.2% for FY00–01, mainly as a result of the 1999 border war with Pakistan in the Kargil mountains).[22]

Second, NMD is stridently opposed by India's major arms supplier, Russia. (India recently ordered Russian T-90C main battle tanks for $760 million, Su-30K fighters for $1.8 billion, a used aircraft carrier with Mig-29Ks for $2 billion, and a host of other weapon systems.) To keep its Russian relationship harmonious, India has supported Russian efforts to inhibit NMD deployment. During a June 2000 visit to Moscow, Indian Foreign Minister Jaswant Singh departed from his government's previous silence on NMD to bemoan its effects on strategic stability. NMD, said Singh, "in fact moves towards militarization of space against which we have always stood."[23]

NMD, said Singh, "in fact moves towards militarization of space against which we have always stood."

Third, although it is hypocritical considering that India has not signed either the Nuclear Non-Proliferation Treaty (NPT) or the Comprehensive Test Ban Treaty (CTBT), India has taken a sudden interest in arms control. Stung by the negative international reaction to its underground nuclear tests in 1998, which were followed within days by Pakistani tests, Indian officials moved towards considering the CTBT. "The Comprehensive Test Ban Treaty which should have been on the back burner after the U.S. Senate rejected it," reported K. Subrahmanyam in the *Times of India*, "has become a matter for debate in this country thanks to Prime Minister Vajpayee's talk of developing a consensus on it. The PM [prime minister] has also indicated that he wants to bring it before Parliament in the Monsoon session."[24] Because Indian officials believe that NMD will abrogate the ABM Treaty and spur the deployment of more strategic nuclear weapons, it will kill the CTBT. Indian officials worry about the Chinese build-up, with their old missiles and new technology finding their way to Pakistan.

Gaurav Kampani, a research associate at the Monterey Institute's Center for Nonproliferation Studies, warns against dangerous "strategic mimicry" affecting South Asia:

"A U.S. decision to deploy NMD, because of the military and strategic contents of the decision, its ideological undercurrents of absolute security, negative consequences for global nuclear disarmament, adverse impact on the nonproliferation regime, and the aggressive unilateralism inherent in the U.S. policy, will influence strategic beliefs in South Asia perceptibly. Above all, NMD would provide the strategic elites in the region a paradigm to remodel their own national security behavior."[25]

Like India, Pakistan would like NMD to go away.

Nuclear arms will become "central to national security" in the region, Kampani concludes, and arms control would end and testing would likely resume.

An editorial in the *Times of India* called the failure of the July 2000 U.S. NMD test "fortuitous."[26]

The fact that Indian criticism of NMD comes largely from academe, think tanks, and the media indicates that the Indian government remains reluctant to contradict its number one trading partner, its number one source of direct investment and technology, and its number one potential diplomatic ally in its rivalry with China and Pakistan. All in all, India prefers that NMD would simply go away.

Pakistan

National Interests. General Pervez Musharraf's October 1999 unplanned coup against Prime Minister Nawaz Sharif thrust the somewhat unprepared General into a political situation loaded with difficult policy choices. Musharraf announced his top priority in response to what he saw as an immediate crisis. "To put it bluntly, we are near the brink of bankruptcy," Musharraf told a Pakistani-American organization in Islamabad soon after the coup. "We have been looted, plundered at will. Our banks, our financial institutions are near being empty."[27] Economic recovery and reform continue as his prime national interest. Second, his government needs to deal with a set of interrelated security issues: opening a security dialogue with India, restraining the mujahideen (Muslim fighters) confronting India over Kashmir, and managing the militant Islamist movement—both Pakistani and foreign-based—within Pakistan. And Musharraf must pursue the top two interests without incurring international isolation, his third national interest.

Reaction to NMD. NMD has largely indirect effects on Pakistan's national interests. According to the Pakistani embassy in Washington, few commentaries dealing with NMD have been published because it is considered mainly a problem for Russia and China. One Pakistani source in Islamabad described his country as "caught in a cross-fire." Opposing NMD, which would please Pakistan's security partner, China, would displease the United States, whose help is needed in rescheduling $3.3 billion in payments on its nearly $32 billion foreign debt and in approving a $280 million IMF loan request.[28] Islamabad's continuing support of the Taliban in Afghanistan and mujahadin incursions into Kashmir already displease Washington.

While China's strategic build-up will help check rival India, the Indian build-up would raise tensions and might force Pakistan to weaponize (make combat ready) the M-11 missiles it bought from China. An Indian move to acquire the Russian S-300 air defense missile system and its conversion to anti-tactical ballistic missile defense (ATBM) would directly threaten Pakistan's deterrent force and leave it with no choice but to increase its nuclear and missile capabilities. This would have little support internationally. In addition, the greater the confrontation with India, the more Islamists will champion the struggle to incorporate Muslim Kashmir in Pakistan and instill Islamic law within the enlarged nation.

Like India, Pakistan would like NMD to go away.

The Republic Of Korea

National Interests. South Korean President Kim Dae Jung's June 2000 summit with Kim Jong Il in Pyongyang crystalized the South's definition of its national interests. The top three follow a definite order, from the most immediate to the long range and from pre-conditions to the final desired outcome.

The most immediate national interest and pre-condition for future aspirations is to end the military threat from the North. Eleven thousand artillery tubes and a half-million troops deployed near the DMZ commanded by an isolated, ideological, totalitarian regime put the South literally under the gun. The summit, President Kim devoutly believed, could break the hostility. It could also lead to serving the South's second national interest: increasing trade, communications, investment, and humanitarian relations with the North. The objective is to modernize, moderate, and

economically develop the North in order to narrow the economic and cultural gap with the South. Doing so would pave the way for Seoul's ultimate national interest: reunification of the two Koreas and, while never explicitly stated, under Southern leadership.

Kim Dae Jung outlined these national interests in what amounted to a post-summit report to the American people published in many U.S. newspapers.

"How, I asked Chairman Kim, can we survive if we, who are one people, waste our energy against each other? On the other hand, even if we cannot unify the country right away, we can open the skies, roads, and harbors. We can come and go freely, cooperate with each other, develop the economy together and have exchanges in culture and sports. . . . [G]aps cannot be narrowed within a short time. But the North will no longer attempt unification by force and, at the same time we will not do any harm to the North. The most important outcome of the summit is that there is no longer going to be any war."[29]

This road map to reunification received widespread and enthusiastic approval at home and abroad.

Reaction to NMD. NMD and TMD, in an unusual way, supports the attainment of South Korea's national interest. Until last year, South Korea's Ministry of Defense explored participation in U.S. TMD or even the purchase of systems from Russia and Israel. Then, in March 1999, the Ministry announced it would not participate in the U.S. TMD program, citing its high costs, unproven technology, and the fact that Korean geography precludes an effective TMD system since Seoul is too close to the demilitarized zone (DMZ) for it to stop incoming short-range missiles.[30]

In effect, South Korea decided to "let the U.S. do it," including going ahead with NMD (about which Seoul has little comment), and with good reason.

General Thomas Schwartz, commander of U.S. forces in Korea, testified before a congressional committee that he strongly supports tiered land and sea TMD systems for the defense of South Korea and the 37,000 American troops stationed there.[31] A TMD system deployed by the United States to protect its troops would also protect most of South Korea, and without cost. Furthermore, a TMD under sole U.S. control and linked to an anti-DPRK NMD, while it would protect the South, signals to the North that the South sees Pyongyang fading as an enemy and that the South has less of a need to threaten the North's deterrent missile capability. South Korea also shelved its plan to extend the range of its own ballistic missiles and has scaled back its August 2000 military exercises with the United States.[32] Giving up TMD encourages more friendly exchanges. And it gives the South a bargaining chip, which tells the North that if it reduces its threat, makes peace, and opens its society, then the U.S. can take its troops and TMD and eventually depart. If, on the other hand, North Korea reverts to hostility, then American troops and their TMD will remain.

By rejecting participation in the U.S. TMD, South Korea can have its cake and eat it, too.

Japan

National Interests. The Japanese mute their discussion of security issues. There has been scant evidence of a vigorous debate on NMD or on the joint research program with the United States to develop a Japanese TMD system. Part of the problem may reflect the constrained and muted character of post-war Japanese leadership. Another may be the limitiations surrounding the use of the Japanese military arising from the experience of World War II and the pacifist Article 9 of its Constitution.[33] As a result, Japanese national interests tend to be subtle, non-threatening, and, since they reflect a common consensus, conservative.

Japan wants to maintain its military alliance with the United States and remain non-threatening to its neighbors. This will serve a second national interest—maintaining access to all foreign markets in order to keep Japan stable and prosperous. Finally, to sustain its top two national interests, Japan wants to maintain and contribute to the international economic and political organizations that provide order to international relations. The word "maintain" best characterizes the motives of Japanese diplomacy.

Reaction to NMD. Japan abstained on the November 1999 Chinese-Russian-Belarus UN General Assembly resolution opposing the scrapping of the ABM Treaty and warning of destabilizing arms races if the U.S. proceeds with NMD. Japan has avoided participation in and has been left out of U.S. policy decisions regarding NMD. Japan worries that NMD may feed the impulse toward "Fortress America,"

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which could marginalize the U.S.-Japanese alliance. Yet Tokyo has distanced itself from the NMD program in order to avoid becoming enmeshed in the international outcry against NMD and to avoid appearing threatening to its Asian neighbors.

Japan's primary concern is providing for its own defense and obtaining U.S. assistance with that task. North Korea's launch of its Taepo Dong-1 missile over Japan in August 1998 quickly brought home to the Japanese their vulnerability to missiles and spurred interest in TMD. A month after the missile firing, Japan's parliament, the Diet, passed a resolution calling on the government to "take all measures to ensure the security of the Japanese people."[34] In December 1998, Japan formalized a TMD joint research plan with the United States, and signed a memorandum of understanding (MOU) on August 16, 1999 that outlined the direction the plan would take. The research will be based on the Navy's Theater-Wide Missile Defense, an upper tier system. U.S. and Japanese officials and defense contractors—led by Mitsubishi Heavy Industries in Japan and Raytheon in the United States—have developed a smooth and unpublicized joint research effort. Japan plans to spend $280 million over the next six years on the project.[35]

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Besides North Korean missiles, Japan worries about Russia and China upgrading their missile arsenals in reaction to its TMD option, about being drawn into any TMD programs undertaken by South Korea or Taiwan, and about TMD's cost.

Japan is especially sensitive about China. "Even if the North Korean threat subsides," said professor Masashi Nishihara at Japan's National Defense Academy, "we need to be wary of China. It's easy for the government to point a finger at North Korea's missile development, but China has more missiles deployed."[36] Such analysis is never publicly expressed by Japanese officials, who are quick to respond to Chinese questioning by stating that Japan's TMD is a threat to no one. When asked if Japan planned to work with South Korea or Taiwan on a broader TMD—a question reflecting Chinese suspicions—Japan's Director General of the Defense Agency, Tsutomo Kawara, answered categorically: "A central tenet in our diplomacy is that our defense is exclusively defensive. This, therefore, does not include the countries in our region. Our focus must be on removing various security threats to Japan. We cannot go about involving our neighbors."[37]

Further refutation of Chinese suspicions appeared in a March 2000 report of the Japanese National Institute for Defense Studies, a research arm of Japan's Defense Agency. Titled "East Asian Strategic Review," the report stated: "The Chinese criticism shows nothing but fear that China's unilateral military supremacy over Japan by deploying ballistic missiles could be threatened. . . . It is not acceptable that [China] criticizes a country which possesses no ballistic missiles for conducting research on TMD."[38] Japan continually emphasizes that it is not an offensive threat to anyone.

Japan's decision to deploy a TMD system is still years away. If it makes a decision to deploy, Japan has yet to decide how its system's command and control will be linked to the American TMD protecting U.S. troops in East Asia or even tied into NMD's early warning satellites. Japan is still mulling over launching its own surveillance satellites in order to keep its TMD, if deployed, strictly national.

Taiwan

National Interests. President Chen Shui-bian spoke of "continuity" in Taiwan's foreign policy in his May 20, 2000 inaugural address. Absent was his call for independence, a position he and his Democratic Progressive Party had long advocated. Like his predecessor, Lee Teng-hui, Chen's primary national interest is to maintain Taiwan's autonomy for the foreseeable future, at least until reunification with the Mainland can be peaceful and painless. Second, Chen called for engagement with Beijing, allowing active diplomacy to serve two key interests: to increase cross-Strait relations that would accelerate the Mainland's socio-economic development and reform, and to avoid providing Beijing with an excuse for using military force against Taiwan. Third, Chen seeks to expand U.S. relations in terms of diplomatic and military support, topping the drive to maximize diplomatic relations (now with about 30, mostly small, states) within the international community.

Reaction to NMD. Taiwan officials rarely mention the U.S. NMD program since it would complicate relations with the NMD-hostile Mainland, but they certainly never criticize it. Instead, Taipei's foreign policy focuses on acquiring its own TMD while obtaining as much military equipment it can from the United States. On March 24, 1999, then-Defense Minister (now

prime minister) Tang Fei speaking before the Yuan's (legislative) Defense Committee, announced a plan to develop a lower-tier TMD system estimated to cost $9.23 billion over 8 to 10 years. Tang emphasized the psychological boost it would give Taiwan because it would neutralize the only credible weapon Beijing wields to intimidate Taiwan.[39] China has approximately 200 short and medium range ballistic missiles deployed across the Taiwan Strait, and is adding 50 or more each year.

In a September 1999 interview with *Defense News*, Tang was asked if TMD was Taiwan's highest priority. "I would say yes," Tang responded, "although we are still coordinating different opinions within government. Establishment of a low-tier defense system is feasible, and we still have time to evaluate systems for upper-tier defense." When asked about acquiring the technology, Tang stated: "We are pursuing Patriot Advanced Capability and also Aegis" from the United States.[40] The defense minister was referring to the PAC-3, a system under development that will be more capable of intercepting ballistic missiles than the PAC-2 system America sold Taiwan in l993. Aegis radar equipped naval destroyers would provide long-range surveillance of missiles and aircraft.

In April 2000, President Clinton turned down Taiwan's request for Aegis destroyers, at least for the time being. Taipei hoped to win approval for the sale, and even dropped the more controversial PAC-3 from its request list to facilitate Clinton's decision. Taipei did receive the approval for the sale of the long-range, land-based Pave Paws early-warning radar.

Perhaps recognizing that the current administration in Washington will neither provide an advanced TMD system to Taiwan nor re-establish formal military ties that were broken off in 1979, Chen's government decided to go it alone. Taiwan's new defense minister, Wu Shih-wen, announced in May 2000 that Taiwan would develop a missile defense system unilaterally, depending upon finances and technological progress. "It is a daunting challenge to us," Wu said.[41] In a July 2000 interview, Wu described missile defense as an essential deterrent to a Chinese attack on the island. "The enemy would be aware that they (sic) have to pay dearly if they dare to attack us."[42]

Taiwan will continue to cultivate ties with Washington, pointing out the threat from the Mainland even as it jockeys to begin negotiations with Beijing in order to pacify its larger neighbor.

Conclusions

- There is little support for NMD in Asia. Defense Secretary William Cohen, desperately seeking some diplomatic approval of NMD, even tried to enlist Australian support during his July 2000 tour of Asia. Although sympathetic, Australia deferred giving its backing.
- Countries not hostile to NMD—South Korea, Japan, and Taiwan—take this stance not because of NMD's merits, but in order to advance their own plans for TMD protection, for which U.S. assistance and possible links to NMD are crucial. The three states, therefore, choose to remain largely silent on NMD, as do the two NMD-doubtful rivals in South Asia, India and Pakistan.
- China and North Korea remain adamantly opposed. Both countries joined with other members of the Association of Southeast Asian Nations Regional Forum (ARF) at its July 2000 annual meeting in roundly criticizing NMD. "This issue is by no means a dispute between China and the United States," said Chinese Foreign Minister Tang Jiaxuan at the closing news conference, "but between the United States and the international community."[43]

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EIGHT

Europe's Role in National Missile Defense

By Tomas Valasek, Senior Analyst, Center for Defense Information

Although intended to protect the United States only, the proposed NMD system will not work without the use of radars in Europe or in territories controlled by European countries. Placing the radars closer to the expected enemy launch sites—known as *forward-deploying* in Pentagon jargon—allows for more accurate reading of the missile trajectories and the actual number of objects launched. Secretary of Defense William Cohen acknowledged the centrality of European allies to the NMD system during a July 2000 Senate hearing. When asked if it was possible to build an effective NMD system without European support, he replied "the answer at this point would be no. . . If you don't have forward-deployed X-band radars, then you can't see the missiles coming."[1]

In its first phase, known as Expanded Capability 1, the NMD system is expected to use two upgraded early warning radars—in Fylingdales, UK, and Thule, Greenland—to detect, track, and count the individual objects in a ballistic missile attack. The original radars were built during the Cold War as a part of a network designed to warn the command center in Cheyenne Mountain, Colorado of intercontinental ballistic missile launches in the Soviet Union. The planned upgrade will make the radars' projections of missile trajectories more accurate. It will also connect the Thule and Fylingdales radars to a dedicated NMD command center. In the latter stages, Capability 2 and 3, the Pentagon plans to expand the existing radar sites to include new X-band radars (see "Technological Challenges in National Missile Defense" for more information on NMD architecture).

Britain and NMD

According to the British press, President Clinton has begun informal negotiations with Prime Minister Tony Blair over the integration of the British installations into the NMD system. In addition to the Fylingdales radar station, U.S. technicians are also upgrading a separate facility in Menwith Hill, UK, which will be used as a downlink station for a network of space-based infrared detection satellites.

Prime Minister Blair and Defence Secretary Geoff Hoon are both reported to be supportive of British participation in the U.S. system but the government has so far avoided taking a public stance on Britain's participation in NMD. The ruling Labor Party is split on the issue. Peter Hain, the Foreign Office Minister, denounced NMD as untested and unreliable.[2] The head of the Foreign Office, Foreign Secretary Robin Cook, is also reputed to oppose NMD for its probable impact on arms control treaties with Russia, but has not publicly declared his views. Opposition Conservatives are strongly in favor of British participation in NMD, and have accused the Labor government of "anti-U.S. Cold War attitudes."[3]

The strongest criticism of NMD to date has come from the British Parliament's Committee on Foreign Affairs. In an August 2, 2000 report on weapons of mass destruction, the committee questioned the rationale for the system and warned that NMD may spark a new round of nuclear arms race in Asia. It criticized the Blair government for avoiding taking a position on NMD and called on the administration to publicly "articulate the very strong concerns that have been expressed about NMD within the UK."[4] However, the committee also acknowledged that Britain's "refusal to allow the upgrading of facilities at Fylingdales would be unprecedented and prove very testing for the [NATO] alliance."[5]

Britain has traditionally been one of the staunchest allies of the United States. The European Union (EU) had not included defense issues in its portfolio until recently in part because the UK, one of the EU's key members, was reluctant to jeopardize its special relationship with Washington. To the surprise of many observers, Prime Minister Tony Blair reversed

Although intended to protect the United States only, the proposed NMD system will not work without the use of radars in Europe or in territories controlled by European countries.

this longstanding British policy in 1998 and called for the buildup of credible military forces under EU auspices in order to enable the Union to respond to international crises.[6] The turnaround has been attributed to Britain's desire to play a more prominent role in the EU and partly to the rise to power of Blair's Labor Party, which has a strong pro-EU agenda. However, despite Britain's newfound willingness to cooperate on defense through the EU, the Blair government has treated its participation in NMD as a purely national, rather than EU issue (see below for more information on the EU's role in the NMD debate).

Britain hopes to avoid choosing sides in the NMD debate to prevent tensions with Russia and a possible rift in the North Atlantic Treaty Organization (NATO), a military alliance of 17 European states, the United States and Canada. The UK has put pressure on Russia to obtain a pledge from North Korea to stop development of long-range missiles. Such a pledge, it is hoped, would remove the rationale for NMD. If the United States proceeds with NMD, Britain will likely accommodate U.S. requests for building NMD installations on its soil in order to preserve its excellent relations with Washington. London may, however, seek missile defense protection for itself in exchange for its cooperation. Defense Secretary Hoon stated that the UK government "will continue to consult closely with the US. . . to help us take an informed decision on whether to acquire [NMD] capability ourselves in the future."[7] The British press reported that Defence Secretary raised the possibility of NMD coverage for Britain at his January 2000 meeting with Pentagon officials.

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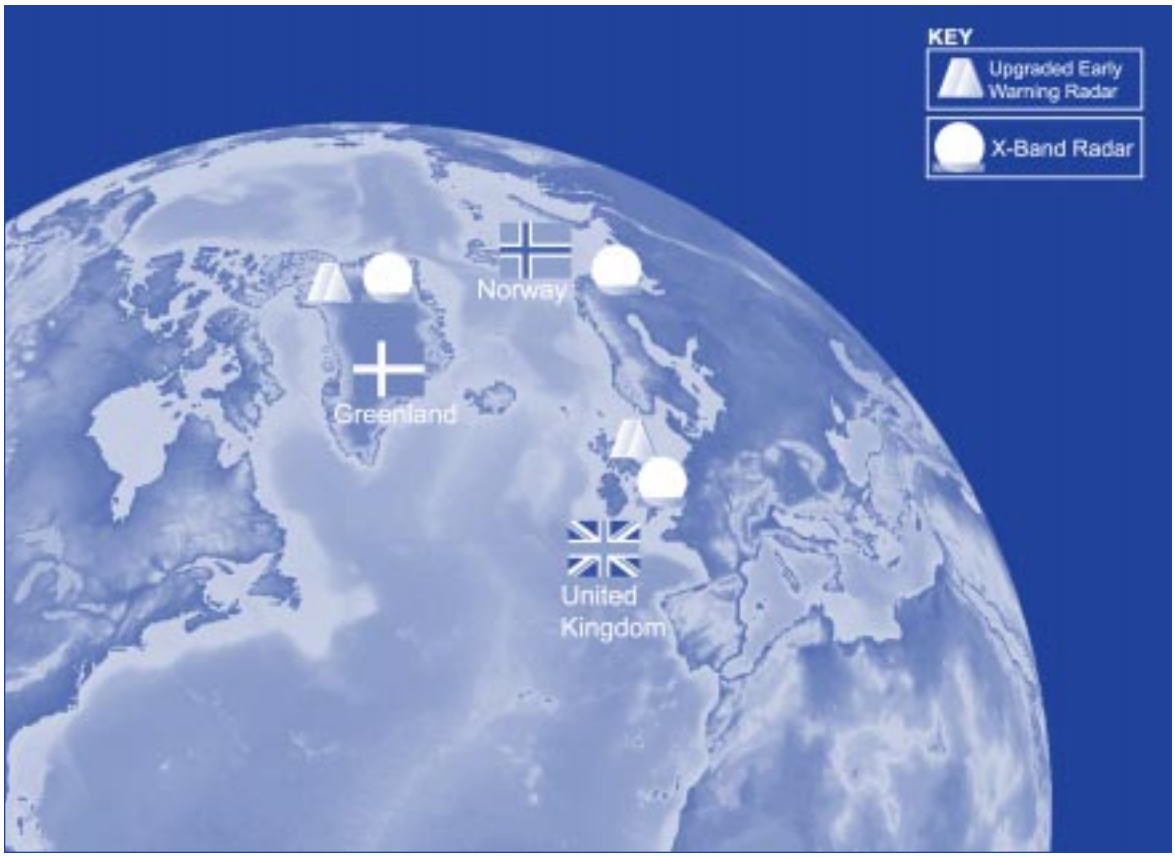
Denmark and NMD

The Pentagon's NMD plans do not include installations in Denmark. However, Denmark is responsible for administering the foreign and security affairs of Greenland. Thule, Greenland currently houses a U.S. early warning radar that the Pentagon wants to upgrade for the Expanded Capability 1 phase of NMD. For Capability 2 & 3, Thule is to be equipped with an X-band radar. The Clinton Administration has briefed the Danish government on its plans for the Thule base for NMD, but has not yet made a formal request for the upgrade or for installation of the X-band radar.

The Danish government agrees with the U.S. Administration on the potential threat posed by long-range missiles in the hands of North Korea



and Iraq. Without declaring a position on NMD, Danish Foreign Minister, Niels Helveg Petersen, expressed his country's reservations about the system by stressing that the use of the Thule station must not contravene the 1972 Anti-Ballistic Missile (ABM) Treaty.[8] The Danes as well as the population of Greenland are clearly concerned about Russia's retaliation against countries cooperating with the United States on NMD. As with other European countries that the Pentagon hopes will host NMD facilities, Denmark has come under pressure from Moscow. "If Washington puts its ABM plans into action and the system involves Danish radar," said Russian Foreign Minister Igor Ivanov, Copenhagen "will be responsible for pulling down the ABM Treaty."[9] Ivanov added that Russia could take retaliatory measures in this case.

Denmark's NMD deliberations are further complicated by Greenland's stance on NMD. Although Copenhagen is officially responsible for the island's foreign and security affairs, as a matter of policy the Danish government strives to involve Greenland's authorities in issues of special importance to the island. A left-leaning government party in Greenland, Inuit Ataqutigiit, opposes the island's involvement in NMD. The United States, in a move that could be aimed at placating opposition to NMD in Greenland, offered to return the Pituffik peninsula to the native Inuits. The Danish government expelled the local population in 1951 and consigned Pituffik to the U.S. government for use by the Thule base.

The Vardo Radar Controversy

Norway, although not included in U.S. missile defense plans, has come to play a controversial role in the ongoing U.S.-Russia dialogue on NMD. Moscow has on numerous occasions alleged that a U.S.-made radar deployed near the Russian border in Norway is part of the NMD system and as such violates the ABM Treaty.

The X-band radar in Vardo, Norway, was manufactured by Raytheon in the early 1990s. It operated for three years at Vandenberg Air Force base in California under the name of HAVE STARE before being dismantled and moved to Norway. The Norwegian government maintains that the radar's sole purpose is to monitor space debris. "We have an exceptionally clear agreement with the Americans. If they wish to use the radar for another purpose than space surveillance, the whole agreement [on the use of the radar by the United States] has to be renegotiated," said the project leader for the Vardo radar at Norway's defense intelligence agency.[10]

However, the radar's unique technical capabilities and its proximity to Russia—40 miles from the border—aroused suspicions in Moscow of foul play. Raytheon's web site on HAVE STARE described the radar as "originally designed to collect intelligence data against ballistic missiles."[11] The Pentagon's earlier NMD designs specifically call for "making the best use" of the HAVE STARE radar.[12]

General Ivashov, the head of the Russian Defense Ministry's Military Cooperation section stated that "in the opinion of our analysts, the [Vardo radar] station will function as part of the anti-missile system [NMD]."[13] He added that Russia would take unspecified measures unless Norway closes the radar during Russian military exercises.[14] The Vardo radar, even if not connected to the NMD system, could be used to monitor Russian tests and gather information on the radar signature of Russian missile launches—information that could be used to improve performance of the NMD system.

In July 2000, a Russian defense expert with close ties to the military, Pavel Felgenhauer, said that Russian weapons were programmed to target the Vardo radar station in Norway.[15] A day later, Norway's Defense Minister Sigur Frisvold suggested that Norway be included in a U.S. missile defense program, ostensibly to protect against threats from "terrorist nations."[16] However, the timing of the request indicates that the move was linked to Russian warnings of a nuclear strike against the Vardo radar.

Impact of NMD on European Countries Hosting NMD Facilities

Countries hosting NMD facilities on their territory have come under immense diplomatic pressure from Russia. In June 2000, Russian President Vladimir Putin warned that Washington's European allies, "primarily Great Britain, Denmark, and Norway, are taking the risk of becoming dragged into a process which will result in an unpredictable loss of strategic stability."[17]

Moscow suggested two possible responses to European cooperation on NMD. In the event that the United States withdraws from the ABM treaty, Russia threatened to build missiles aimed at European cities. President Putin said in June 2000 that Moscow "may abandon its

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commitments. . . under the treaty on elimination of intermediate-range and shorter range nuclear missiles."[18] The treaty, known as INF, required the destruction of missiles with ranges between 500 and 5,500 kilometers (312 to 3,125 miles), capable of hitting any European city from Russian territory. However, President Putin's warning to resurrect the intermediate range missile program is likely to prove a hollow threat, at least in the short term. The only Russian plant capable of producing intermediate range SS-20 missiles is already producing long-range SS-27 missiles at full capacity. More recently, however, Moscow also warned that it might target NMD facilities on European territory with nuclear weapons.

The NMD plans put the European countries in a position of assisting a program aimed at providing additional safety for the United States but doing so at the likely expense of their own security. Many European states do not agree with the threat assessment that has led to NMD's conception in the first place. All oppose any steps that would violate the ABM Treaty. Even the Parliament in Britain, traditionally the most loyal among European allies, has warned the United States that it cannot "necessarily assume unqualified UK co-operation with. . . plans to deploy NMD in the event of unilateral US abrogation of the ABM Treaty."[19]

Most European countries regard the planned NMD system as a potential threat to the defense ties established by NATO and a threat to stability in Europe.

Europe's importance to NMD and the clear doubts there about the value of the NMD program has made it a subject of lobbying effort by both sides of the NMD dispute. Even Moscow has mixed its occasional threats to Europe with offers of cooperation. In June 2000, President Putin offered to construct a Europe-wide missile shield with Russian involvement. Similarly, Pentagon spokesperson Ken Bacon has said that President Clinton is prepared to share NMD technology with U.S. allies.[20] As noted above, Britain and Norway raised the possibility of NMD coverage for its territory with Pentagon officials.

National Missile Defense and the NATO Alliance

For most European allies, the U.S. nuclear umbrella historically served as the last shield against a nuclear attack from the USSR. Among the European countries, only France and Britain possess small numbers of nuclear weapons. To dispel any doubts about U.S. commitment to Europe's defense—and to further deter the Soviet Union from attacking Western Europe—the allies formed NATO in 1949. Article V of NATO's founding act, the Washington Treaty, obligated the allies to come to each other's aid if any one of them came under attack.

Despite the end of the Cold War, all European NATO members opted to preserve their defense links to the United States. The European Union, which includes 11 out of NATO's 19 members, is gradually assuming some of NATO's traditional responsibilities such as peacekeeping (see below for more information on EU's role in the NMD debate). However, the EU countries also repeatedly stressed in official declarations that the European Union's role will be limited and that NATO remains the foundation of the collective defense of its members.

Most European countries regard the planned NMD system as a potential threat to the defense ties established by NATO and a threat to stability in Europe. NMD is viewed as a symptom of an emerging "fortress mentality" in the United States, which, many European governments fear, will weaken the U.S. commitment to defend its NATO allies. U.S. Secretary of Defense William Cohen admitted that European countries are worried that NMD "will decouple us from our European friends."[21] The fears in Europe of a rising tendency in the United States to act unilaterally, often against the wishes of its allies, were also fueled by rejection in the U.S. Congress of a series of international agreements that Europe strongly favored and supported, including the Comprehensive Test Ban Treaty (CTBT) in October 1999.

On the other side of the Atlantic, many in the U.S. Congress regard the EU's new defense initiative as a challenge to American involvement in Europe through NATO. The two developments—NMD and the new emphasis in Europe on EU defense cooperation—can potentially derail NATO cooperation by sending the wrong signal to the respective parties about each other's commitment to the alliance.

The European Union on NMD

Conceived as an economic organization, the European Union (EU) has taken an increasingly active role in coordinating its members' foreign and security policies. In 1999, the EU created the office of High Representative on Common Foreign and Security Policy empowered to act on behalf of the European Union in negotiations with other countries. To add military muscle to its nascent foreign policy arm, the EU also agreed in 1999 to build a 50,000–60,000 strong

Rapid Reaction Force and a separate civilian crisis management group. The latter body, composed of judges, police and other officials, is designed to help administer crisis response plans.

While the EU strives to speak with a single voice in foreign and security affairs, it has so far been unable to arrive at a common position on NMD. The power to decide on issues affecting territorial defense, such as NMD, is being jealously guarded by national capitals. British Foreign Minister Robin Cook spoke for many EU governments when he told the British Parliament: "I am not sure I would regard it as wise for us to seek a specific European Union policy on NMD given our own very entrenched view that the European Union should not be a place for territorial collective defence."[22] German Foreign Minister Joschka Fishcher, while urging the EU countries to adopt a joint position, admitted that "interests are not homogeneous within Europe." [23] Given that the EU can only adopt a position by consensus, European countries may find it impossible to discuss NMD on the EU level and will likely seek resolution of their differences with the United States on a bilateral level or through NATO.

Similarly, the EU is unlikely to adopt a position on NMD installations on the European continent. Of the three countries involved directly or indirectly, Norway is not an EU member, Denmark does not participate in EU's defense policies (EU members have the right to opt out of cooperation on certain issues), and Britain, as noted above, has resisted discussing NMD in the EU for domestic reasons.

Conclusions

- U.S. plans to field a national missile defense system have exposed the three European countries with projected or suspected NMD facilities on their territory to diplomatic pressure from Russia. These countries—Britain, Denmark, and Norway—may seek missile defense protection for their territories as well.
- Although there is no unified opinion on NMD in Europe, governments of the most important allies have voiced strong concerns about NMD's impact on arms control treaties with Russia and the potential destabilization in Europe resulting from renewed U.S.-Russian tensions. Many European countries also dissent from the United States on the assessment of the severity of the missile threat from "rogue" countries.
- NATO allies on the European continent worry that NMD will further strengthen tendencies in the United States to act unilaterally and often against the wishes of its allies.

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While the EU strives to speak with a single voice in foreign and security affairs, it has so far been unable to arrive at a common position on NMD.

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NINE

Chronology of U.S. National Missile Defense Programs

By Colonel Daniel Smith, USA (Ret.), Chief of Research, Center for Defense Information

The 1940s

July 4, 1945	Despite conclusions by U.S. industry that available technology precludes building an effective defense, the Army makes its first recommendation to begin a research and development effort to counter ballistic missiles.
December 1945	Army Air Force Science Advisory Group broaches the idea of using an "energy beam" for defense against ballistic missiles.
March 4, 1946	The Army Air Force begins two studies, Project Thumper and Project Wizard, focused on the possibility of developing anti-missile missiles capable of destroying incoming projectiles traveling at 4,000 mph and at altitudes reaching 500,000 feet.
May 29, 1946	The Stilwell Board Report, noting that future advanced "guided missiles. . . would be incapable of interception with. . . fighter aircraft and antiaircraft fire," recommends development of "guided interceptor missiles."

The 1950s

1955	After 50,000 simulated ballistic missile intercepts on an analog computer, Bell Laboratory scientists conclude that "hitting a bullet with another bullet" is possible.
October 4, 1957	Sputnik is launched into space, initiating the era of long-range ballistic missiles.
January 16, 1958	The Army, which had been working on the Nike-Zeus anti-ballistic missile (ABM) system since 1955, is designated lead service for ballistic missile defense.
1958–1968	Project Defender, a wide-ranging research and development program that explores the use of a 400 foot diameter web as a hit-to-kill system for boost-phase intercepts, is funded. No system is deployed.

The 1960s

July 19, 1962	During a test over the Pacific Ocean, a Nike-Zeus comes within 2 kilometers of a dummy Atlas intercontinental ballistic missile (ICBM) warhead, close enough for an actual nuclear warhead on the interceptor to destroy the target.
December 22, 1962	Another Nike-Zeus comes within 200 meters of a target reentry vehicle. Nike-Zeus is replaced by the Nike-X program, which employs two types of nuclear tipped interceptors and the new phased array radar.
November 10, 1966	Secretary of Defense McNamara publicly confirms that the USSR is deploying its Galosh anti-ballistic missile (ABM) system.

September 18, 1967	The Pentagon announces the decision to deploy the two-layer Sentinel ABM system (which succeeded Nike-X) consisting of the nuclear tipped Spartan (long range) and Sprint (short range) interceptors in order to protect the U.S. from the "Nth country threat" of simple ICBMs such as those deployed by China.
July 1, 1968	President Johnson announces that the U.S. and USSR will discuss limits on both strategic nuclear arsenals and ballistic missile defenses. Talks are canceled when Moscow invades Czechoslovakia in September.
February 6, 1969	The Nixon Administration halts Sentinel deployment pending a full review of U.S. strategic programs.
March 14, 1969	President Nixon announces resumption of the deployment of the renamed ABM system—now called Safeguard—but with its initial focus to be on protecting U.S. ICBM sites. An "expansion option" allows for the system to cover population centers against the "Nth country threat."
August 1969	The Senate votes for deployment of the Sentinel system with Vice President Spiro Agnew casting the tie-breaking vote.

The 1970s

May 26, 1972	President Nixon and Soviet General Secretary Brezhnev sign the ABM Treaty that prohibits a nation-wide missile defense while permitting each side two deployment sites limited to 100 interceptors at each location.
July 3, 1974	The ABM Treaty is amended to permit only one defensive missile site for each party.
October 1, 1975	The Nekoma, ND (Grand Forks) Safeguard ABM site becomes operational.
October 2, 1975	The House of Representatives votes to close the Grand Forks site because the new Soviet multiple independent reentry vehicle (MIRV) program would easily overwhelm Safeguard. Vulnerability to direct attack and technical problems such as radar blinding by electromagnetic pulse from exploding nuclear warheads made the system unreliable, and even actually threatened Minuteman forces it was assigned to protect.
November 18, 1975	The Senate follows the lead of the House in voting to terminate Safeguard.
February 1976	The Grand Forks site goes into "caretaker status."
1978	Except for its supporting radar, which is incorporated into the North American Air Defense Command's (NORAD) warning and assessment network, Safeguard is closed completely.

The 1980s

January 8, 1982	A private group of advisors recommends to President Reagan that he launch a crash program to develop missile defenses.
February 11, 1983	The Joint Chiefs of Staff advise President Reagan of the need to emphasize strategic defensive systems.
March 23, 1983	President Reagan delivers a national television address in which he calls for research into defenses that would make "nuclear weapons impotent and obsolete."
March 24, 1983	Opponents in Congress label President Reagan's vision of a defensive umbrella "Star Wars."

March 25, 1983	The Administration's ABM policy on missile defense is formalized in National Security Decision Directive 85.
April 18, 1983	Two evaluations are begun, one to look at the state of ABM technology and recommend a way forward (Defense Technologies Study or the Fletcher Report), the second to assess strategy and policy ramifications of the ABM effort (Future Security Strategy Study or Hoffman Report).
October 1983	The Hoffman Report is completed. It states that missile defenses could enhance deterrence and development of tactical missile defenses could contribute toward development of a NMD system.
	The initial draft of the Fletcher Report is completed. It recommends two research options, one funded at $20.9 billion between Fiscal Years 1984–1989 and a less preferred, more fiscally restrained alternative.
April 24, 1984	Secretary of Defense Weinberger signs SDIO's charter.
1984	SDIO's master plan concentrates directed energy research on five technologies: space-based chemical weapons; ground-based laser weapons; space-based particle beam weapons; nuclear (X-ray) directed energy; and support subsystems for these weapons.
June 10, 1984	After two earlier but only partially successful attempts, a Minuteman missile with a "web-like" hit-to-kill interceptor package guided by infrared sensors and a computer destroys a target missile over the Pacific. (However, the General Accounting Office in a 1994 report notes that the target had been artificially heated to increase its infrared signature.)
April 1985	The controversy over narrow vs. broad interpretation of the 1972 ABM Treaty gets underway.
September 6, 1985	A Titan rocket simulating the conditions of a rocket booster is destroyed by an infrared advanced chemical laser.
December 1985	Two reviews of SDIO are completed. The first finds SDIO is undermanned to fulfill its charter and needs to be reorganized. The second finds that developing computing and battle management software are "the paramount strategic problem[s]" facing SDIO.
July 30, 1986	SDIO is reorganized to give greater weight to resolving system architecture problems.
August 1986	A National Test Bed is established to help resolve problems associated with integrating battle management requirements.
September 11, 1986	The Delta 180 experiment, the first "equivalent" of boost phase intercept, is completed.
October 11–12, 1986	President Reagan declines to agree to limitations on SDI proposed by Soviet President Gorbachev.
November 1986	The idea of employing "brilliant technologies"—miniature sensors and computers that would reduce size, cost, and vulnerability of SDI space-based components—is championed.
May 13, 1987	A legal review of the 1972 ABM Treaty concludes that the Treaty does not prevent testing space-based missile defenses, including directed energy weapons.
June/July 1987	As a result of a Defense Acquisition Board review of the SDI program, the baseline architecture for Phase I is approved and the program begins the demonstration and validation phase of the DoD acquisition process.

January 19, 1988 Senator Sam Nunn (D-GA) proposes focusing SDI on development of a "limited system for protecting against accidental and unauthorized launches" with a subsequent goal of making the system more comprehensive.

February 9, 1989 SDIO chief General Abrahamson, in his end of tour report, says that a space-based defensive architecture employing the "Brilliant Pebbles" concept could be ready in 5 years at a cost of $25 billion or less. Brilliant Pebbles consists of thousands of interceptors each capable of independent operations against whatever comes within its field of vision.

June 14, 1989 Based on a general review of U.S. national security strategy, President Bush decides to continue the SDI program emphasizing development of space-based boost phase interceptor technologies such as Brilliant Pebbles.

The 1990s

March 15, 1990 An independent review of SDI endorses Brilliant Pebbles. The review also details what becomes the Global Protection Against Limited Strikes (GPALS) concept.

January 29, 1991 President Bush announces the reorientation of SDI to GPALS—"protection from limited ballistic missile strikes, whatever their source." He anticipates GPALS would afford protection against as many as 200 long range missiles.

April 28–May 6, 1991 The Discovery space shuttle provides SDIO officials 17 "engine firings" against different backgrounds (earth, black space) which aid the development of sensors to detect missile launches.

December 5, 1991 President Bush signs the Missile Defense Act of 1991 (part of H.R. 2100) which mandates DoD "develop for deployment by the earliest date allowed by the availability of appropriate technology or by Fiscal Year 1996 a cost effective, operationally effective, and ABM Treaty-compliant anti-ballistic missile system. . . designed to protect the United States against limited ballistic missile threats, including accidental or unauthorized launches or Third World attacks." The Act directs that Brilliant Pebbles space-based interceptors not be part of any initial deployment.

May 1992 House Armed Services Committee Chairman Les Aspin raises the specter that "in this new [post-Cold War] world" the U.S. cannot assume that nuclear equipped adversaries will "always be rational or at least operate with the same logic as we do."

July 2, 1992 Secretary of Defense Richard Cheney sends Congress a report that details the deployment strategy for an operational evaluation system capable of providing limited protection by 1997.

July 1992 The Department of Energy cancels the last test of the six year old proposed X-Ray laser weapon system, effectively ending the program which had been suffering from technical problems, funding shortfalls, and competition from other non-nuclear based technologies.

May 1993 Secretary of Defense Les Aspin renames SDIO the Ballistic Missile Defense Organization (BMDO) and reorients its priorities to developing theater missile defenses.

February 15, 1995 The House narrowly defeats the portion of the Republican "Contract with America" that would require deploying a nation-wide missile defense "as soon as practical."

November 1995	A National Intelligence Estimate (NIE 95-19) judges that "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."
March 1996	The "Defend America Act," which declares as U.S. policy that the nation will deploy a limited missile defense by 2003, is introduced in both Houses of Congress, but it does not come to a vote because of the estimated cost of deployment.
April 1996	The Clinton Administration's "3 + 3" national missile defense plan—three years for development and, if warranted, three more years to deploy a system—is established.
	The Pentagon changes the purpose of NMD from a "technology" readiness program to a "deployment" readiness program.
April 9, 1996	BMDO is directed to establish a Joint Program Office to manage the deployment readiness program for national missile defense.
December 1996	A congressionally chartered panel headed by former CIA Director Robert Gates concurs with the time lines estimated in the 1995 NIE.
January 21, 1997	A new version of the "Defend America Act" is introduced in the Senate, but it does not come to a vote.
April 1, 1997	BMDO establishes the Joint Program Office (JPO) for the NMD program. The JPO is responsible for "the design, development and demonstration of an NMD system to defend the U.S. from ballistic missile attack by 2003."
June 24, 1997	IFT 1A flight test of "a candidate infrared sensor" is conducted using the Boeing/TRW exoatmospheric kill vehicle (EKV).
August 6, 1997	Members of a congressionally chartered panel chaired by former Secretary of Defense Donald Rumsfeld are named to "examine the current and potential missile threat to all 50 States and to assess the capability of the U.S. intelligence community to warn policymakers of changes in this threat."
August 11, 1997	BMDO's NMD acquisition strategy is approved, and a request for proposals for the next phase of the Lead System Integrator contract is released.
August 21, 1997	The U.S.-Russian Standing Consultative Commission's 55th session ends with agreement on TMD-NMD demarcation and on the matter of succession to the ABM Treaty.
September 25, 1997	The Pentagon-created "Task Force on Reducing Risk in Ballistic Missile Defense Flight Test Programs" (the Welch panel) meets for the first time.
September 26, 1997	The United States, Russia, Belarus, Kazakhstan, and Ukraine sign the August 21 agreements in New York.
January 15, 1998	IFT 2 flight test is conducted using the Raytheon (Hughes) EKV.
February 1998	In the first of what will be annual reviews, the Welch panel criticizes shortcomings and overambitious time lines that amount to a "rush to failure" in various missile defense programs.
March 19, 1998	Senator Thad Cochran (R-MS) introduces the American Missile Protection Act which says it will be "U.S. policy to deploy, as soon as technologically possible, a National Missile Defense system."
April 30, 1998	In a contract worth $1.6 billion (but potentially as much as $6 billion), the Pentagon names Boeing the lead systems integrator for NMD.

May 13, 1998	The attempt to debate the "American Missile Protection Act" is defeated by a single vote in the Senate.
July 15, 1998	The Rumsfeld Commission states that the ballistic missile threat to the U.S. *could* emerge with little warning and *likely* will appear sooner than U.S. intelligence agencies have estimated. Some panel members dissent.
July 27, 1998	The Pentagon announces the selection of the booster for the NMD Ground-based Interceptor (GBI)
August 31, 1998	North Korea launches a Taepo Dong 1 three stage missile over Japan, but the third stage malfunctions and fails to put the satellite payload in orbit.
September 9, 1998	In the aftermath of the North Korean launch, Senate Republicans again try to begin debate on the "American Missile Protection Act" but again fail by one vote.
January 20, 1999	The Pentagon requests more money for NMD programs, delays the target date for achieving initial operating capability from 2003 to a "more realistic" 2005, and sets a June 2000 date for a deployment decision by the Administration.
February 5, 1999	The Air Force cancels its contracts with TRW and Boeing to design and develop the prototype satellites for SBIRS-Low
February 10, 1999	BMDO conducts Risk Reduction Flight 5, which is designed to reduce the technical risks inherent in NMD.
March 16, 1999	"The National Missile Defense Act of 1999," which declares as U.S. policy that America will "deploy as soon as technologically possible an effective National Missile Defense system," passes the Senate.
March 17, 1999	The House of Representatives approves a measure committing the U.S. to deploy national missile defenses.
May 20, 1999	The House approves legislation stating that it is the policy of the U.S. to field limited national missile defenses as soon as technically feasible.
July 23, 1999	In signing "The National Missile Defense Act of 1999," President Clinton states the four criteria he will consider in making his decision to deploy: the threat, the cost, the technological status of NMD, and adherence to a renegotiated ABM Treaty.
August 17, 1999	The U.S. and Russia resume strategic arms talks that include a modification of the ABM Treaty to allow the U.S. to deploy a limited national missile defense system.
September 1999	The Welch panel's second look at the reconfigured timelines for NMD again concludes that the program is "high risk" and recommends that the President's June 2000 decision be considered a "feasibility" rather than a "readiness to deploy" judgment. A new NIE, "Foreign Missile Developments and the Ballistic Missile Threat to the United States Through 2015," judges that "during the next 15 years the United States *most likely* will face ICBM threats from Russia, China, and North Korea, *probably* from Iran, and *possibly* from Iraq."
October 2, 1999	The first Integrated Flight Test (IFT 3) that attempts to bring down a target missile employing elements of the proposed NMD system is hailed by the Pentagon as an unqualified success. Later it is revealed that the kill vehicle initially homed in on the single decoy released by the target.

The 2000s

January 18, 2000	The second attempted intercept (IFT 4) fails when the infrared sensor on the kill vehicle malfunctions. The Pentagon nevertheless declares the test a success because it "learns" so much even from a failure.
February 14, 2000	Philip Coyle, Director of the Pentagon's Office of Operational Test and Evaluation, tells Congress that "undue pressure has been placed on the [NMD] program" by the requirement to meet the artificial deployment deadline of 2005.
June 13, 2000	The third Welch panel report states that the "technological capability to develop and field" a limited NMD system to handle "the defined threat" is available but that meeting the 2005 target date for IOC "remains high risk." The panel also points out that flight tests encompass only "a limited part of the required operating envelope."
June 2000	Administration lawyers conclude that initial work connected with constructing the X-band tracking and discrimination radar on Shemya Island in the Aleutians will not violate the ABM Treaty.
July 7, 2000	The third Integrated Flight intercept (IFT 5), delayed twice from the original April test date, fails. The EKV does not separate from the surrogate booster and therefore does not activate its sensors. Additionally, the Mylar decoy on the target rocket fails to inflate.
August 2000	A new NIE on the emerging ICBM threat to the U.S. is completed and sent to the President. Mr. Clinton will consider its findings as part of his decision on whether to proceed with preparations for the X-band radar site on Shemya Island.
September 1, 2000	Citing the status of technology, the refusal by Russia to agree to modify the ABM to permit deployment of an NMD system, and the reluctance of our closest allies to endorse NMD unless strategic stability can be assured through a modified ABM Treaty, President Clinton decides not to authorize work to begin on deploying NMD.
January 2001	With IFT 5 a failure, the Pentagon projects it may not be able to conduct another test until the beginning of 2001.
Summer 2001	The Defense Acquisition Board (DAB) will consider a decision to purchase elements of the system to be deployed.
2003	The DAB will evaluate whether to build and deploy interceptors. This milestone rests on successful testing of a production interceptor mated with the kill vehicle against a target.
2005	Target date for deploying the Capability 1 system with 20 interceptors. In his September 1, 2000 announcement, President Clinton spoke of a deployment in "2006 or 2007."
2007	Target date for deploying the Expanded Capability 1 system with 100 interceptors. The addition of an expanded Ballistic Missile Command, Control and Communications package, together with the 100 ground based interceptors to be deployed by this year, would "convert" the Expanded C-1 system to the Capability 2 system.
2011	Target date for deploying the Capability 3 system with 125 interceptors at each of 2 sites (in Alaska and North Dakota), 3 command centers, 5 communications relay stations, 15 radars (6 early warning and 9 high resolution UHF or X-band), and 29 satellites (Space Based Infrared High and Low).

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Acronyms

ABL	Airborne Laser
ABM	Anti-Ballistic Missile
ARF	ASEAN Regional Forum
ASEAN	Association of South East Asian Nations
ATBM	Anti-Tactical Ballistic Missile
BAMBI	Ballistic Missile Boost Intercept
BJP	Bharatiya Janata Party (ruling party in India)
BMC3	Battle Management, Command, Control, and Communications
BMDO	Ballistic Missile Defense Organization (succeeded SDIO)
C1–C3	Capability 1–3 (stages of NMD deployment)
CBO	Congressional Budget Office
CIA	Central Intelligence Agency
CRS	Congressional Research Service
CTBT	Comprehensive Nuclear Test Ban Treaty
DAB	Defense Acquisition Board
DoD	Department of Defense (U.S.)
DMZ	Demilitarized Zone (on the border of North and South Korea)
DPRK	Democratic People's Republic of Korea (North Korea)
DSP	Defense Support Program (satellites)
EKV	Exoatmospheric Kill Vehicle
ERIS	Exoatmospheric Reentry Vehicle
EU	European Union
GAO	General Accounting Office
GBI	Ground Based Interceptor
GPALS	Global Protection Against Limited Strikes
GSTS	Ground-Based Surveillance and Tracking System
ICBM	Intercontinental Ballistic Missile
IFICS	In-Flight Interceptor Communications System
IFT	Integrated Flight Test
INF	Intermediate Range Nuclear Forces Treaty

IOC	Initial Operational Capability
JPO	Joint Program Office (of BMDO)
MIRV	Multiple Independent Reentry Vehicle
MOU	Memorandum of Understanding
NATO	North Atlantic Treaty Organization
NIE	National Intelligence Estimate
NMD	National Missile Defense
NORAD	North American Air Defense Command
NPT	Nuclear Non-Proliferation Treaty
PAC	Patriot Advanced Capability (theater missile defense system)
SALT	Strategic Arms Limitation Talks
SBIRS	Spaced Based Infrared System (High and Low)
SBL	Space-Based Laser
SDI/SDIO	Strategic Defense Initiative/Organization
SLBM	Submarine Launched Ballistic Missile
SMTS	Space and Missile Tracking System
START I–III	Strategic Arms Reduction Treaty
TMD	Theater Missile Defense
UEWR	Upgraded Early Warning Radar
UHF	Ultra-High Frequency
UK	United Kingdom
USAF	United States Air Force
USN	United States Navy
USSR	Union of Soviet Socialist Republics (Soviet Union)
WTO	World Trade Organization

Glossary

Aegis: a computer-based "from detection to kill" combat system used on U.S. Navy surface vessels that is capable of simultaneous operation against a variety of surface, underwater, and air threats.

Ballistic missile defense: measures taken to destroy or otherwise defeat a missile which follows a ballistic trajectory when thrust is terminated.

Boost phase intercept: measures used to destroy a ballistic missile in that portion of its flight during which the booster and sustainer engines operate.

Booster: in missile defense, the very fast rocket that carries the warhead or "kill vehicle" to the proximity of the planned intercept point.

Brilliant Pebbles: a component of the Global Protection Against Limited Strikes (GPALS) missile defense proposed by President Bush in 1991. It consisted of a global detection system and 1,000 small, space-based, hit-to-kill interceptors envisioned to be effective against ballistic missiles with ranges greater than 600 kilometers (375 miles).

Brilliant technologies: miniature sensors and computers that reduce size, cost, and vulnerability of SDI space-based components.

De-alerting: reducing the extremely high readiness launch status of nuclear weapons systems to a lesser level of preparedness to launch.

Discrimination: ability to distinguish real warheads from decoys.

Early warning radar: surveillance radar that provides rapid detection and tracking of the launch or approach of a ballistic missile or other weapon targeted against the United States.

Exoatmospheric: 60 miles or more above the earth's surface; the desired area for intercepting hostile missiles.

Forward deploying: U.S. military units, ships, or aircraft that are either permanently stationed in foreign nations or are sent to foreign nations on a preplanned basis or in response to a threat.

Geosynchronous: occupying a stationary point in space relative to the earth at a fixed altitude of 22,300 miles.

Hit-to-kill: an intercept technology in which the interceptor rams the hostile missile, destroying it by the force of the impact.

Infrared: that part of the electromagnetic spectrum falling between approximately 0.72 to 1,000 microns which can be detected as radiation being emitted by or reflected from an object.

Interceptor: in missile defense, the combination of the booster and the kill vehicle designed to engage an offensive missile.

Intercept envelope: the area, designated by minimum and maximum altitudes and minimum and maximum distance from launch point, in which a defensive system can operate effectively against an offensive missile.

Kill vehicle: the warhead carried by the interceptor; may operate either by exploding in the vicinity of the target or, as in "hit-to-kill" systems, by impacting with the target at high velocity.

Lower tier: in theater missile defense, a defensive system designed to operate effectively within the earth's atmosphere (below approximately 60 miles of the earth's surface) against an offensive ballistic missile. Current lower tier systems being developed are the Army's Patriot Advanced Capability 3 (PAC-3) and the Navy's Area Wide.

Layered defense: a system of overlapping zones which provide a defender with more than one opportunity to effectively engage an offensive weapon. In national missile defense, refers to intercept opportunities at various phases of the offensive missile's flight (boost, mid-course, terminal). In theater missile defense, refers to intercept opportunities employed at different altitudes (upper and lower tier).

National missile defense: the combination of early warning and ballistic trajectory tracking radars, interceptor missiles, and command, control, and communications networks intended to provide a nation-wide umbrella against intercontinental ballistic missile attack. The current system under development is "limited" as it is programmed to have a maximum of 250 interceptors at two locations.

Off-the-shelf: equipment or technologies that do not have to be further modified for military use.

Rumsfeld Commission: A 1997–98 congressionally chartered panel that reviewed the existing and potential ballistic missile capabilities of other nations and the likelihood that such capabilities would constitute a threat to the United States.

Shoot down: the destruction of a target by either an offensive or defensive system.

Silo-busting: use of an offensive ballistic missile whose warhead is of sufficient power to destroy an opponent's land-based missiles before they are launched.

Stand-off distance: the interval that a sensor or weapons platform maintains from its potential target locations in order to avoid exposure to enemy offensive systems such as tactical aircraft or surface-to-air missiles.

Theater missile defense: interceptors designed to destroy shorter range (non-intercontinental) ballistic missiles aimed at deployed troops or overseas facilities.

3 + 3: The 1996 Clinton Administration proposal for three years of additional research on National Missile Defense to be followed, if warranted, by three years of work in deploying an initial operational system.

Treaty Compliant Location: with reference to the 1972 Anti-Ballistic Missile Treaty, as amended, the geographic area in which Russia and the United States are allowed to deploy ballistic missile defenses. For the United States, this is near Grand Forks, ND.

Upper tier: in theater missile defense, a defensive system designed to operate effectively above the earth's atmosphere (approximately 60 miles or more above the earth's surface) against an offensive ballistic missile. Current upper tier systems being developed are the Army's Theater High Altitude Area Defense (THAAD) and the Navy's Theater Wide.

Welch Report: A series of reviews of the National Missile Defense Program by an independent Pentagon commission headed by retired Air Force Chief of Staff General Larry Welch.

X-band radar: a multifunction, narrow beam, high frequency radar capable of tracking and discriminating ballistic missiles and their warheads, making possible the "kill" calculations which are performed by the battle management system and passed to interceptors.

Center for Defense Information
1779 Massachusetts Avenue, NW
Washington, DC 20036
(202) 332-0600 • Fax: (202) 462-4559
www.cdi.org