Missile Defense: The First Sixty Years

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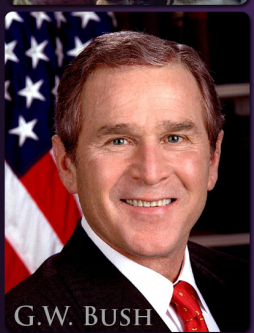

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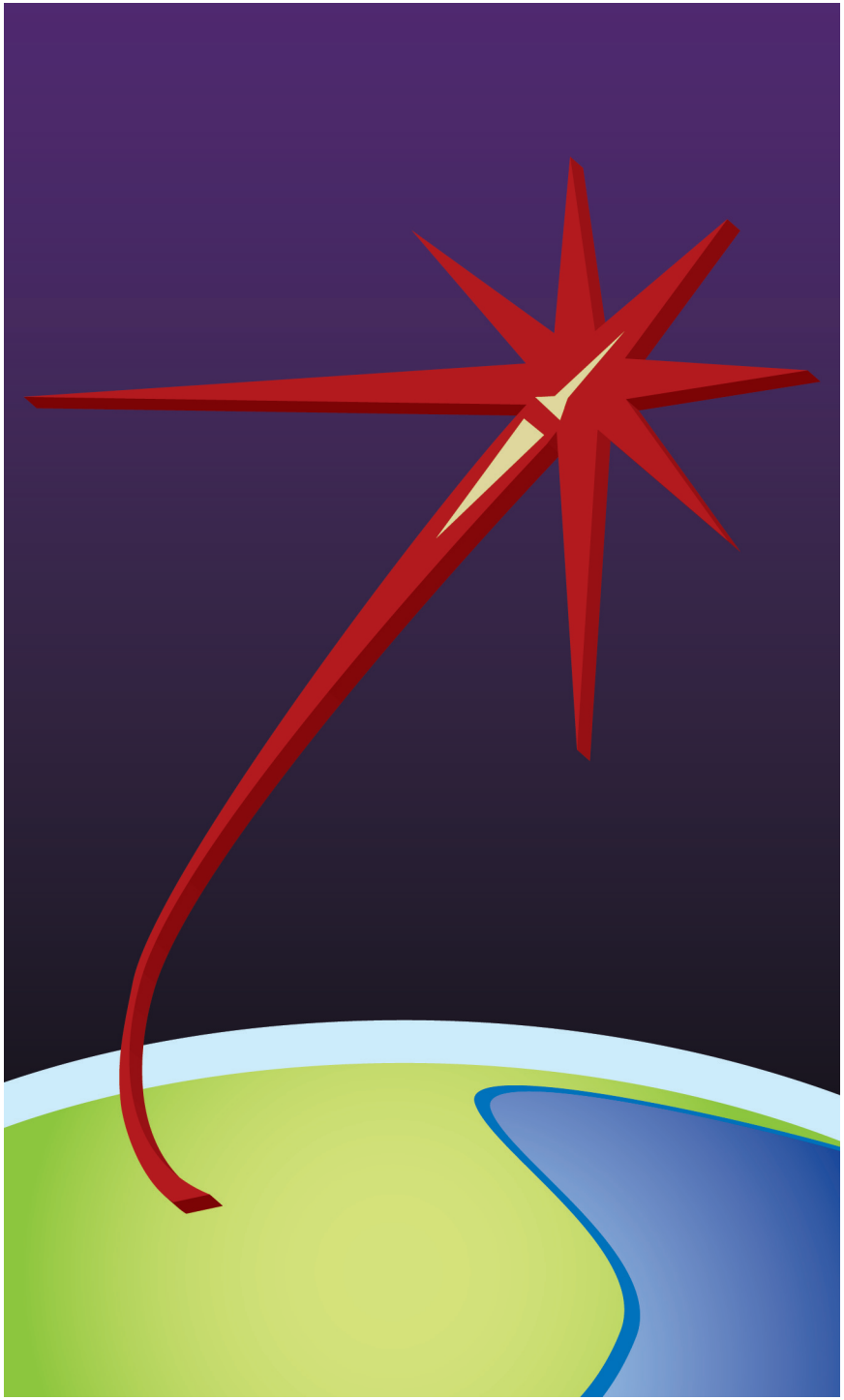


Strategic Defense Initiative Organization (SDIO)
1984 – 1994

Ballistic Missile Defense Organization (BMDO)
1994 – 2002

Missile Defense Agency (MDA)
Established January 2, 2002

Preface

The mission of the Missile Defense Agency History Office is to document the official history of America's missile defense programs and to provide historical support to the MDA Director and staff.

This pamphlet, one in a series intended to quickly acquaint interested readers with the history of America's missile defense programs, provides an overview of the first sixty years of active missile defense. It describes the many ambitious, and often controversial, anti-ballistic missile (ABM) development programs and how they contributed to today's Ballistic Missile Defense System (BMDS). These developments can be divided into two eras, the first that featured nuclear-armed missiles and the second, the era of the hit-to-kill, nonnuclear type of interceptor that is currently deployed.

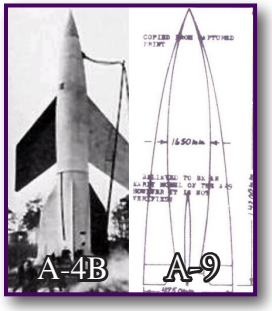
Dr. Lawrence M. Kaplan, MDA Historian, welcomes constructive comments and suggestions from readers regarding the content of this booklet.

E-mail: Lawrence.Kaplan@mda.mil
Telephone: 703-882-6546

Missile Defense: The First Sixty Years

Dawn of the Missile Age–1944

During World War II, United States Army staff planners recognized the need for a defense system against a weapon like the German A-4 (Aggregate-4), later called the V-2 (*Vergeltungswaffe Zwei* or Revenge Weapon-2), the world's first ballistic missile, and that available conventional weapons were not capable of combating this threat. The Germans fired their first operational V-2, with a range of about 200 miles, against Great Britain on September 8, 1944. It was not a decisive weapon. It was inaccurate and carried a limited payload; however, by the end of the war more than 1,000 had fallen on Great Britain. They also hit targets in Belgium, France, Luxembourg, and the Netherlands. There was no defense against them, other than bombing or occupying their launch sites.

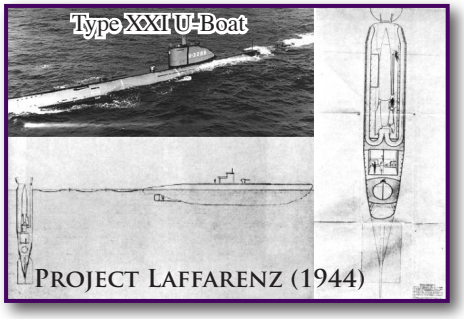


The Germans attempted to improve the V-2 through redesign and innovation. They produced a 466-mile extended-range, modified-winged version, the A-4B, which was intended to glide to its target after the engine's power cutoff. Although the A-4B reached the flight test stage in January 1945, it never became operational.

A larger version of the V-2 called the A-9 also was conceived, but never built. It was expected to have a 375-mile range and also would glide to its target. One version of the missile included a pressurized cabin for a pilot who would have dropped the warhead on its target and returned to base using a retractable landing gear.

In 1944, the Germans developed plans to attack targets in the United States with V-2s. One plan, Project Laffarenz, conceived of employing Germany's

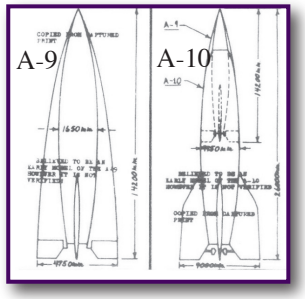
latest Type XXI snorkel-equipped U-Boats to tow three V-2s, each in special displacement containers, across the Atlantic within striking range of the American coast. The containers, equipped with special ballast cells, would be trimmed to neutral buoyancy and towed to the launch location by the submarines. The cells would be flooded to elevate the container into a vertical or angular position and held there by special stabilizers. The U-boat would then pump fuel into the V-2 and fire the missile. By late 1944, at least one of the containers was reportedly completed at the Baltic port of Elbing, but it was never tested with a live firing.



Project Laffarenz (1944)

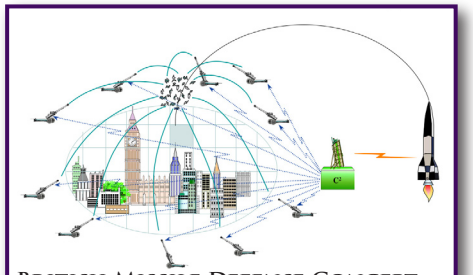
When the war in Europe ended, Germany's most ambitious plan to surpass the V-2 involved an intercontinental-range missile still on the drawing board. It was a two-stage 3,350-mile range missile called the A-9/A-10. The first stage A-10 booster would have separated at about a 110-mile altitude and been recovered with the aid of special parachutes. The second stage A-9 would then have continued under its own power to an altitude of about 215 miles before descending to 28 miles, where the density of the air would have permitted its wing controls to guide it on its final glide path to the target. The Germans also considered using a manned A-9 version, in which a pilot would have steered the missile on its final glide path, then ejected and parachuted to safety as the missile slowed down and neared its target.

Some Germans believed that had the war lasted another six months, they would have been able to produce the A-9/A-10 and strike targets in the United States, such as New York City. Some also believed that if the war had lasted another two years, they could have developed a 15,000-mile range intercontinental ballistic missile (ICBM). The implications for the future were clear. While longer-range ballistic missiles might not be decisive weapons, they would pose a serious military and terror threat.



First Missile Defense "Architecture"–1945

On May 14, 1945, a week after the war in Europe ended, U.S. Army Brigadier General William A. Borden, Director of the Army Staff's New Developments Division, assigned a team of officers to study Allied efforts at countering the V-2. They went to Europe to investigate any techniques to detect, track, and destroy V-2 missiles, particularly the use of predicted or barrage antiaircraft artillery fire against V-2s. They found the British had devised several operational concepts for defending London against V-2 attacks, using radars to detect V-2 launches, applying updated data to grid coordinates to plot and determine the missiles' trajectories, and then, at the proper moment using a massive antiaircraft artillery barrage to destroy a small percentage of the incoming V-2s.


British Missile Defense Concept

Pile

General Sir Frederick Pile, chief of Britain's Anti-Aircraft Command, estimated it would have taken about 12,000 antiaircraft rounds to destroy one V-2 with existing means. He believed his defense initially could have destroyed between three and ten percent of attacking V-2s, and would have improved capability over time. However, the Allies overran the V-2 launch sites before he could try out his defense system, and his superiors were reluctant to let him test it unless it offered a better success rate.

General Pile's plan had significant practical limitations, including an incredibly short reaction time and an enormous expenditure of antiaircraft artillery, but it marked a significant starting point in coming to grips with the tremendous challenges of missile defense. It is especially noteworthy that his command developed a workable missile defense concept in the middle of a war using available weapons and equipment. In retrospect, his vision to seek an initial missile defense capability, and build upon it in the face of seemingly impossible

odds, represented an innovative if controversial approach to missile defense.

Origins of the U.S. Missile Defense Program–1945

A U.S. Army Ground Forces Equipment Review Board, headed by Major General Gilbert R. Cook, first recognized the need to develop a means of defending against ballistic missiles with more advanced weaponry than conventional antiaircraft artillery. On June 20, 1945, the Cook Board submitted its report on equipment for the postwar Army that recommended: "High velocity guided missiles, preferably capable of intercepting and destroying aircraft flying at speeds up to 1,000 miles per hour at altitudes up to 60,000 feet or destroying missiles of the V-2 type, should be developed at earliest practicable date." When General Borden's team of officers submitted their report on July 4, 1945, they recommended a development program to defend against "V-2 type missiles" and suggested exploring all possible countermeasures for missile defense, "particularly the use of guided counter-missiles." Yet, neither the Cook Board nor Borden's team of officers could have anticipated that the atomic bombing of Hiroshima on August 6, 1945, would dramatically alter the calculus for missile defense as the possibilities of an atomic-armed ballistic missile quickly became apparent.

Hiroshima

Arnold

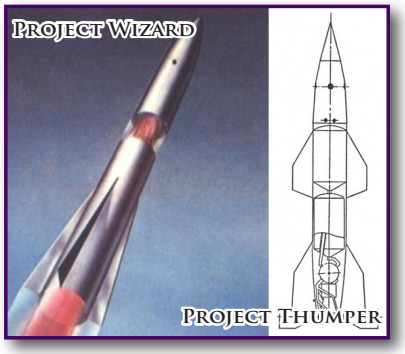
General of the Army Henry H. Arnold, Commanding General, U.S. Army Air Forces (USAAF), was in a pivotal position to influence a decision on missile defense as his service developed and produced surface-to-air guided missiles for the Army. Although the technical challenges and costs of missile defense were clearly formidable, he championed the cause of seeking a missile defense capability in his comprehensive November 1945 report on airpower and the future, which noted: "Although there now appear to be insurmountable difficulties in an active defense against future atomic projectiles similar to the German V-2 but armed with atomic explosives, this condition should only intensify our efforts to discover an effective means of defense."

The following month, an Army Air Forces Scientific Advisory Group study called "Toward New Horizons," reflected General Arnold's vision for a future Air Force and endorsed seeking an active missile defense solution. The multipart study suggested the possibility of using atomic-armed missile interceptors, and kinetic energy, or hit-to-kill missile interceptors, among several missile defense possibilities.

Stilwell

A January 1946 War Department Equipment Board report concurred with the earlier findings on missile defense. Headed by U.S. Army General Joseph W. Stilwell, the Stilwell Board recognized that "intercontinental missiles capable of carrying atomic explosive over a range in excess of 3,000 miles, are probable within the predictable future," and recommended developing an antiaircraft missile that could intercept and destroy both high-performance aircraft and V-2 type ballistic missiles. The next step was to begin developing such a missile.

Projects Wizard and Thumper–1946

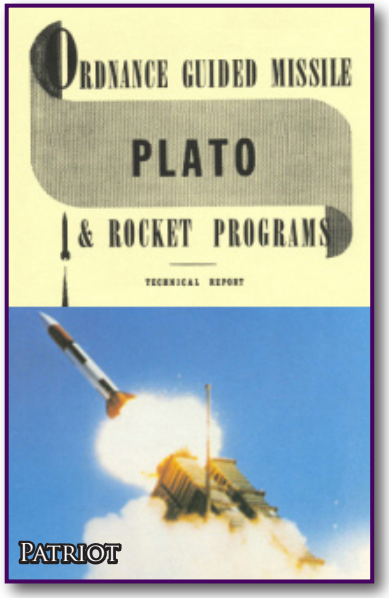


In March 1946, the USAAF initiated two study programs, Projects Wizard (MX-794) and Thumper (MX-795), to undertake a basic design for an antiballistic missile (ABM). The ABM was to operate at altitudes up to 500,000 feet against V-2 type missiles traveling between 4,000 and 5,000 miles per hour. Later, both programs broadened to include all supersonic targets flying above 60,000 feet. Initially, Wizard and Thumper planners envisioned designs for two-stage, liquid-fuel interceptors armed with conventional blast fragmentation warheads. Thumper had the distinction of using the World War II German Wasserfall antiaircraft guided missile as the basis for its design with the possibility of later adopting an atomic warhead. These ambitious programs were significant for being the first efforts focused on seeking an active missile defense solution.

In 1947, the USAAF, which became the U.S. Air Force that year, reviewed Projects Wizard and Thumper, and recognized the complex technical challenges of developing an ABM system; a task they assessed would take at least five to ten years. They determined: "If these missile programs as such are supported to the maximum intelligent extent, the financial drain on the AAF program would be such as to seriously compromise the development of all other types of missiles." As a result, the Air Force subsequently combined its two ABM programs, closing Thumper in 1949, and consolidating its findings in the Wizard program, which continued on a long-term study basis.

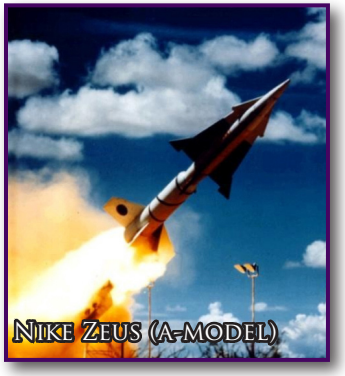
Theater Missile Defense Gets Under Way–1949

While the Air Force worked on its interceptor concept, the Army established a formal requirement for a theater ABM system in 1949. This requirement led to Project Plato in the early 1950s, the Army's first effort to develop such a system. Ever-changing requirements eventually led to Plato's replacement by a succession of systems that included the Field Army Ballistic Missile Defense System (FABMDS), the Army Air Defense System for the 1970s (AADS-70s), which became the Surface-to-Air-Missile—Development (SAM-D). SAM-D was ultimately renamed Phased Array Tracking Radar Intercept On Target (PATRIOT) in honor of the 1976 U.S. Bicentennial celebration. These systems provided the building blocks for developing a reliable theater ballistic missile defense (BMD) system in more advanced versions of the PATRIOT.



The Army's Strategic Missile Defense Mission–1958

As the Cold War unfolded after World War II, America determined that it faced a hostile and expansionist Soviet Union. The growing threat of Soviet long-range missiles in the 1950s posed an unprecedented challenge to defending America against attack. In 1955, intelligence reports of an impending Soviet

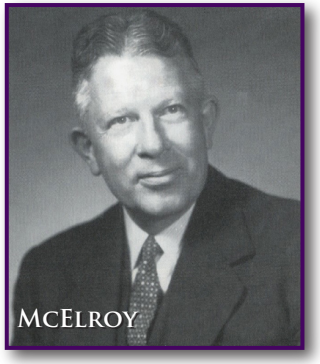


ICBM threat spurred the Department of Defense to launch a major ballistic missile development program to match the Soviets. Several redundant, high-priority offensive missile programs were mounted by the Army, Navy, and Air Force, which blurred distinctions among the services' roles and missions. It was in this environment that the Army sought to compete with the Air Force's Project Wizard for a role in strategic missile defense.

The Army had been developing several air defense missiles since the end of World War II and used this experience to initiate development in February 1957 of the nuclear-capable Nike Zeus ABM interceptor. Nike Zeus was intended to be part of an integrated defense system, which included advanced radars for acquisition and tracking and battle management communications equipment that would protect U.S. cities.

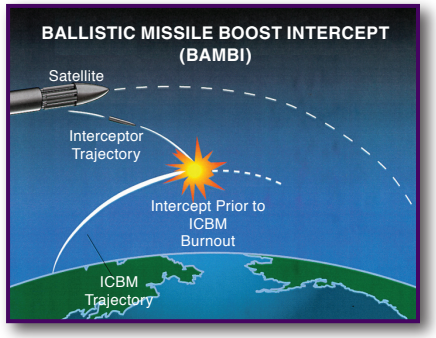
From the outset, the Nike Zeus program's shortcomings and potential high costs made it a focal point of criticism and debate, notably from the Air Force and the scientific community. In the midst of this growing controversy, on October 4, 1957, the Soviet Union launched Sputnik, the world's first artificial satellite. This catalytic event fueled perceptions of a "missile gap" between the United States and the Soviets, heightened concerns about American vulnerabilities to a Soviet ICBM attack, and created a political environment more supportive of fielding even a problematic ABM system.

By early 1958, the Army and Air Force rivalry over dominance of the strategic missile defense program led Defense Secretary Neil H. McElroy to settle the dispute. On January 16, 1958, he assigned the active strategic defense mission to the Army. Later that month, a National Security Council position paper on continental defense, NSC 5802, called for "an anti-ICBM weapons system as a matter of the highest national priority."



Project Defender–1958

Secretary McElroy also established the Advanced Research Projects Agency (ARPA) in early 1958 to identify new means for advancing defense capabilities. In missile defense, ARPA's Project Defender, took an unconventional, far-sighted approach to the perplexing problems anticipated from a mature Soviet ICBM threat in the 1970s. As one ARPA official put it, researchers were encouraged "to forget about present engineering limitations and let their scientific imaginations roam wide and high." Project Defender looked beyond the capabilities of Nike Zeus and examined all phases of BMD, including the use of space-based, hit-to-kill interceptors to destroy attacking missiles during their boost phase. Collectively, these interceptor concepts were known as BAMBI, for Ballistic Missile Boost Intercept. Despite its unconventional and exotic approaches to missile defense, however, Project Defender's recommendations had to be technically feasible and economically practical in meeting threats that might evolve far in the future.



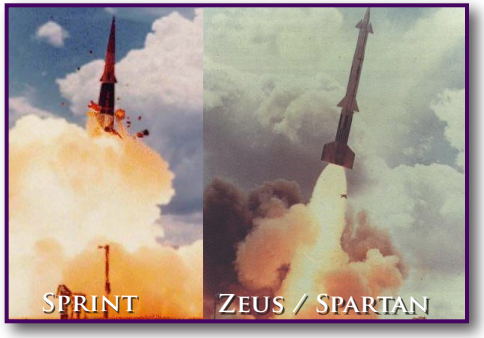
The Nike-X ABM System–1963

The October 1962 Cuban Missile Crisis brought the United States and Soviet Union close to the brink of nuclear war when the Soviets, lacking an effective ICBM capability, placed medium- and intermediate-range ballistic missiles in Cuba to threaten the continental United States. The crisis inadvertently provided an impetus to the Soviets, who were forced to back down and withdraw the missiles, to aggressively improve their ICBM program.

Although Nike Zeus tests in 1962 demonstrated the system's ability to intercept enemy warheads, by early 1963, its technical and operational shortcomings scuttled it as a viable ABM system. Notable among these was the inability of

the mechanically steered Nike Zeus acquisition radars to cope with the type of massive Soviet attack envisioned for the 1960s, and the inability of the system to adequately discriminate between warheads and decoys. Consequently, in January 1963, the Defense Department reoriented its ABM efforts in an improved and more robust system called Nike-X.

Initially, the key components of the Nike-X ABM system included a new family of advanced phased-array radars that could detect and track a large number of objects simultaneously; a new nuclear-armed, high-acceleration, terminal defense missile called the Sprint, which made possible the use of atmospheric filtering to discriminate between decoys and warheads; and the longer-range Nike Zeus interceptor, which was subsequently modified and renamed Spartan, for high altitude targets. Together, the two interceptors promised a potential layered defense for intercepting enemy warheads within and above the atmosphere.

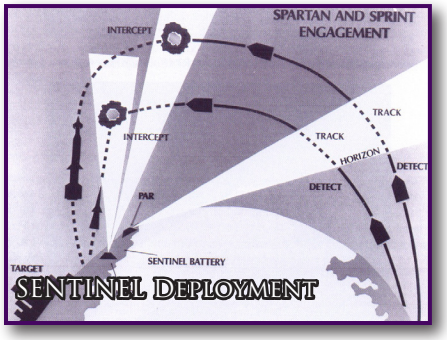


The decision to develop Nike-X coincided with intelligence reports that the Soviets were developing an ABM capability that could be operational by 1966. President Lyndon B. Johnson and Defense Secretary Robert S. McNamara believed the best way to counter the deployment of a Soviet ABM system was through an arms control agreement or by overcoming it with offensive weapons. They resisted calls from members of the Joint Chiefs of Staff and members of Congress to match the Soviets and deploy the Nike-X ABM system, which they believed would have fueled a new and expensive arms race, until a different potential ballistic missile threat emerged.

Following the detonation in October 1964 of Communist China's first atomic explosive, the debate over a Nike-X ABM system deployment began shifting in favor of a limited, or thin, ABM deployment to counter China instead of a heavy ABM deployment to counter the Soviets.

Sentinel, SABMIS and ABMIS–1967

In 1967, Secretary McNamara settled the debate over deploying the Nike-X ABM system. The failure of the Johnson Administration to reach an arms control agreement with the Soviets in June 1967, and China's detonation of its first hydrogen bomb that month, influenced Secretary McNamara to announce the deployment of a thin anti-Chinese ABM system based on the Nike-X system in September 1967. In November, he subsequently announced that the new ABM system would be renamed Sentinel.



In 1967, the Navy and Air Force also developed ABM system concepts. The Navy examined a midcourse ABM system concept called the Sea-Based Anti-Ballistic Missile Intercept System (SABMIS), which envisioned employing radars and interceptors mounted on surface vessels and interceptors on submarines. These vessels would have been deployed in the Northwestern Pacific and the North Atlantic to protect the continental United States from Soviet or Chinese attack, as well as helping defend America's allies from off-shore positions.

The Air Force had a similar concept called the Airborne Ballistic Missile Intercept System (ABMIS), which would have been used against low-trajectory attacks from submarine-launched ballistic missiles. ABMIS envisioned radars and interceptors mounted on specially equipped aircraft, such as the C-5A, on around-the-clock patrols adjacent to major cities overseas.

Sentinel Controversy–1968

In June 1968, the Johnson Administration and its Senate supporters began shifting the justification for the Sentinel ABM system away from its "thin" urban defense against Chinese missiles and expanded its orientation towards defense of land-based ICBMs and a "thick" ABM system to save American lives against a large-scale Soviet attack. The shift coincided with a Soviet agreement to begin long-sought arms control negotiations and reflected the political viability of the Sentinel system as a potential arms control "bargaining chip" with the Soviets. This shift in rationale, however, fueled debate, criticism and confusion over the intended purpose of the Sentinel system, which became a topic of increasing controversy.

President Nixon Reorients Missile Defense–1969

In 1969, President Richard M. Nixon, responding partly to the public backlash over locating nuclear-armed missiles near urban areas, reoriented the Sentinel ABM system away from urban defense to protecting the nation's strategic deterrent silo-based Minuteman ICBMs against a Soviet attack. Emphasizing this reorientation, President Nixon renamed the system Safeguard. Although controversy continued over deploying the ABM system, Safeguard became an important "bargaining chip" during recently initiated arms control negotiations with the Soviets, the Strategic Arms Limitation Talks (SALT). Initially, there were to have been up to twelve Safeguard sites deployed in phases depending upon how well talks with the Soviets proceeded.

The Anti-Ballistic Missile Treaty–1972

In May 1972, arms control talks with the Soviets produced the Anti-Ballistic Missile (ABM) Treaty, which restricted the deployment of any strategic space-based, sea-based, or mobile ABM systems, such as SABMIS and ABMIS. The treaty allowed each side only two fixed missile defense sites: one to defend national command authorities, and one to defend a missile field, with no more

ABM Treaty (1972)

than 100 total interceptors for both sites. A 1974 protocol subsequently reduced the number of sites to one, still allowing each to have up to 100 interceptors. Since the United States was already deploying Safeguard to protect an ICBM field at Grand Forks Air Force Base in North Dakota, this was the only U.S. ABM site allowed until June 2002, when the U.S. withdrew from the ABM Treaty.

Safeguard's Deployment–1975-1976

Safeguard Grand Forks

Having served its purpose as a political bargaining chip, the Safeguard site at Grand Forks was only operational from October 1975 to February 1976. The site was closed at the direction of Congress because it could be easily overwhelmed by a Soviet attack, and because it had a major technical problem: the detonation of its nuclear-armed warheads would blind its own radars.

The Homing Overlay Experiment–1983-1984

By the late 1970s, the continued growth in the quantity and quality of Soviet ICBMs, which included impressive accuracy improvements in the SS-18 missile, threatened the survivability of U.S. land-based ICBMs. At the same time, the United States was unable to find a politically acceptable, secure basing mode for its next generation ICBM, the MX. These circumstances prompted U.S. strategic planners to revisit the possibilities of deploying a missile defense system for its land-based ICBM force with nonnuclear interceptors.

Homing Overlay Interceptor

The Army had been working on developing a nonnuclear hit-to-kill interceptor prior to the deployment of Safeguard. It held a series of tests in 1983 and 1984 called the Homing Overlay Experiment (HOE) to demonstrate this capability. On June 10, 1984, in the last of four tests, a HOE vehicle successfully intercepted a dummy warhead outside the atmosphere in the first successful demonstration of hit-to-kill technology in space.

Directed Energy and Missile Defense–1980

While the Army continued its BMD research and development, ARPA's successor, the Defense Advanced Research Projects Agency (DARPA), formed the Directed Energy Office in 1980 to exploit newly emerging laser and particle beam technologies for applications that included BMD. The office initiated the space defense TRIAD program, composed of three separate research projects, with an objective of determining the feasibility by 1988 of developing a space-based laser battle station that could target Soviet ICBM launch sites. DARPA also envisioned possible ground-based and space-based particle beam weapons for terminal defense and boost or midcourse defense, respectively.

President Reagan Launches the Strategic Defense Initiative–1983

Reagan

President Ronald W. Reagan desired a strategic alternative to the national security policy of nuclear deterrence and mutual assured destruction that left America defenseless against Soviet missile attacks. At the same time, U.S. land-based ICBMs were growing more vulnerable to a Soviet first strike, and the United States was unable to satisfactorily field the MX (renamed "Peacekeeper") missile. These factors influenced the Joint Chiefs of Staff in February 1983 to unanimously recommend that the president begin pursuing a national security strategy with an increased emphasis on strategic defenses. In concert with the

Joint Chief's recommendation, several prominent missile defense advocates had been persuading the president to embrace strategic defense; these included physicist Edward Teller, known as the "Father of the Hydrogen Bomb," and retired U.S. Army Lieutenant General Daniel O. Graham, who headed High Frontier, a citizen's organization dedicated to leading the U.S. toward a secure future in space. Consequently, on March 23, 1983, President Reagan announced his decision in a nationally televised speech to launch a major new program, the Strategic Defense Initiative (SDI), to determine whether or not missile defenses were technically feasible.

An unexpected consequence of President Reagan's SDI speech occurred the following day when the *Washington Post* quoted a critical comment from Senator Edward M. Kennedy of Massachusetts, who labeled the speech as "reckless Star Wars schemes." The term "Star Wars" derived from the science fiction film of the same name and had been used previously in references to various exotic Pentagon space weaponry projects. Senator Kennedy's remark, however, gave the term new meaning and SDI became widely identified thereafter as "Star Wars."

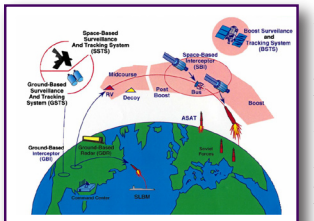
The Strategic Defense Initiative Organization–1984

ABRAHAMSON

In April 1984, following a year of studies, the Defense Department chartered the Strategic Defense Initiative Organization (SDIO). Headed by U.S. Air Force Lieutenant General James A. Abrahamson, SDIO managed a consolidated and expanded missile defense program that was created largely by combining existing projects under way in several government agencies. Ultimately, SDIO's programs, which included plans for space-based missile defenses, would have required altering or possibly withdrawing from the ABM Treaty.

The Strategic Defense System Phase I Architecture–1987

By the autumn of 1987, SDIO had developed a national missile defense concept called the Strategic Defense System (SDS) Phase I Architecture, composed of a space-based interceptor; a ground-based interceptor; a ground-based sensor; two space-based sensors; and a battle management system. Using hit-to-kill interceptors, the architecture's goal was to destroy a given percentage of warheads in a massive Soviet missile attack against the United States, while



STRATEGIC DEFENSE SYSTEM PHASE 1 ARCHITECTURE

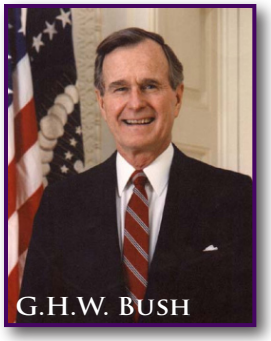
improvements in its later phases would increase the system's operational effectiveness. From the outset, however, the architecture fueled controversy since its adoption would require withdrawing from the ABM Treaty, and because its space-based component had two major shortcomings: its expense, and vulnerability to Soviet antisatellite weapons.

Brilliant Pebbles–1990

BRILLIANT PEBBLES

In 1990, a new hit-to-kill interceptor concept called Brilliant Pebbles offered potential solutions to the space-based interceptor's cost and survivability issues. Brilliant Pebbles was based on many small, autonomous, space-based interceptors and replaced the original space-based interceptor concept in the SDS Phase I architecture.

Global Protection Against Limited Strikes–1991


G.H.W. BUSH

The improvement of SDIO's Phase I architecture with Brilliant Pebbles coincided with a shift in strategic planning. Following the opening of the Berlin Wall in November 1989, which signaled the ending of the Cold War, President George H.W. Bush ordered a review of the SDI program. The review, completed in March 1990, recommended reorienting the program to develop strategic defenses against limited attacks on the United States and theater defense against attacks by short-range ballistic missiles on overseas forces.

The president formally announced this new system, Global Protection Against Limited Strikes (GPALS), in his January 1991 State of the Union Address. Its principal goal was to defend America against limited missile attacks and protect deployed United States forces and America's friends and allies against shorter-range ballistic missiles. GPALS was an integrated architecture with three

components: a global, space-based system of Brilliant Pebbles interceptors; a force of ground- and sea-based theater missile defenses; and a limited, ground-based national missile defense element.

President Clinton Reorients Missile Defense–1993

The trend toward greater emphasis on Theater Missile Defense (TMD) in this new architecture continued into the presidency of William J. Clinton, who emphasized compliance with the ABM Treaty. The Clinton Administration broke up the GPALS architecture into separate components, cancelled the Brilliant Pebbles program, and changed the name of SDIO to the Ballistic Missile Defense Organization (BMDO) in May 1993 as a reflection of the program's reorientation. The name change became official in June 1994.

The Theater Missile Defense portion of BMDO encompassed several Army, Navy, and Air Force programs. These included improvements in the Army's PATRIOT missile, known as PATRIOT Advanced Capability-3, or PAC-3; and a new Army missile initially known as the Theater High Altitude Area Defense, or THAAD. Also included were the Air Force's Airborne Laser project; and the lower-tier Navy Area Defense and upper-tier Navy Theater Wide programs, both of which were based upon significant modifications to the shipborne Aegis air defense system and Standard Missile (SM) interceptor.

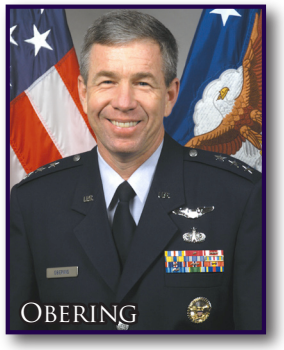
By 1996, new intelligence estimates of ballistic missile threats to America, and a Republican-controlled Congress, gave a new impetus to strategic missile defense, now called National Missile Defense (NMD). By the end of President Clinton's second term, NMD overshadowed Theater Missile Defense as Congress pressed the president to deploy an NMD system with implications for altering the ABM Treaty. Consequently, in July 1999, President Clinton signed the National Missile Defense Act of 1999, which made it "the policy of

the United States to deploy as soon as is technologically possible an effective National Missile Defense system capable of defending the territory of the United States against limited ballistic missile attack (whether accidental, unauthorized or deliberate)." The president had four criteria for making a deployment decision: the NMD system had to be operationally effective, cost-effective, enhance U.S. security, and be in accordance with achieving arms control objectives, which included amending the ABM Treaty to accommodate a possible NMD deployment. On September 1, 2000, however, he annouced that he would defer a deployment decision to his successor following a series of missile defense test failures, delays in some program elements, and a new wave of controversy over deploying an NMD system that included debate on altering the ABM Treaty.

President Bush Reorients Missile Defense–2001

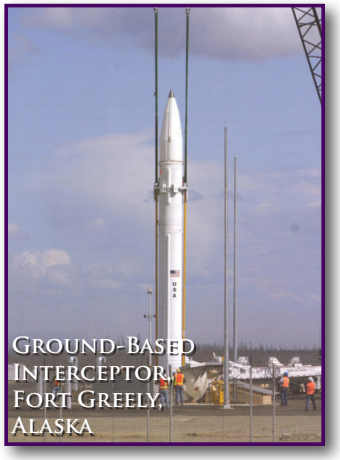
Upon taking office in 2001, President George W. Bush brought to his presidency a strong commitment to deploying missile defense in the shortest possible time. On December 13, 2001, he gave Russia the six-month notice of U.S. intent to withdraw from the ABM Treaty, which became effective on June 13, 2002. Subsequently, on December 17, 2002, he issued a statement announcing the national policy on ballistic missile defense that required the Secretary of Defense to "proceed with fielding an initial set of missile defense capabilities" in 2004.

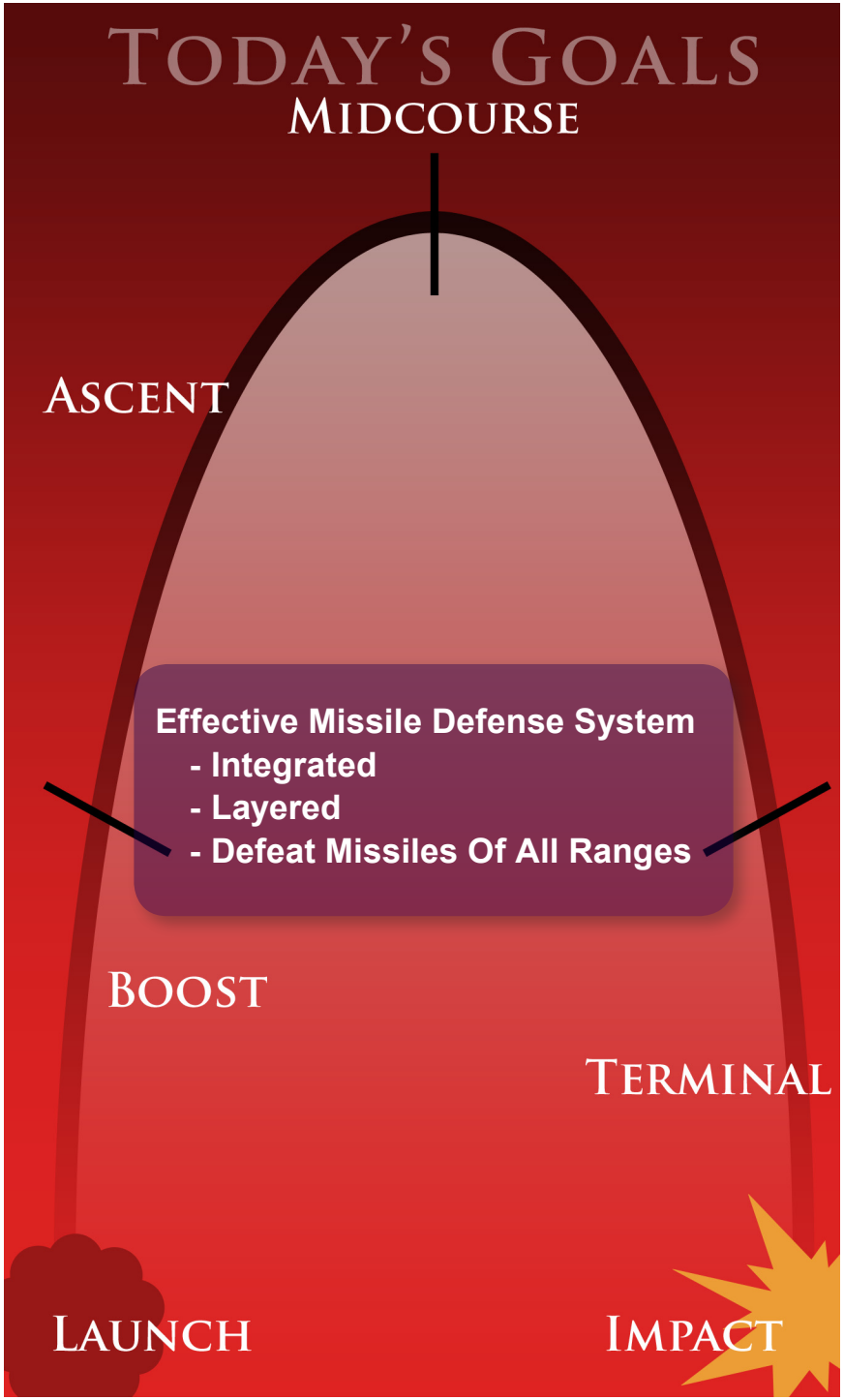
Under President Bush's leadership, Defense Secretary Donald H. Rumsfeld and BMDO Director, U.S. Air Force Lieutenant General Ronald T. Kadish, reoriented the missile defense program with a concept for an integrated, layered defense that would be capable of attacking warheads and missiles in all phases of their flight—boost, midcourse, and terminal—and was expected to eventually provide global defenses against missiles of all ranges. As a reflection of these changes Secretary Rumsfeld issued a January 2, 2002 memorandum changing the name of BMDO to the Missile Defense Agency (MDA).



By the end of 2004, sixty years after the first V-2 missiles struck Great Britain, MDA, under the leadership of its new director, U.S. Air Force Lieutenant General Henry A. "Trey" Obering, III, began limited defensive operations of its Ballistic Missile Defense System (BMDS) after deploying five long-range Ground-based Midcourse Defense (GMD) interceptors at Fort Greely, Alaska. Together with the PAC-3 interceptor for short-range BMD, and the Aegis SM-3 for medium-range BMD, for protecting deployed United States forces, friends and allies, the GMD interceptors enabled midcourse engagement of intermediate- and intercontinental-range ballistic missiles, and a limited defense of the United States against near-term ballistic missile threats as the BMDS continued development.

Deployment and Beyond



In establishing the foundation for the BMDS, MDA adopted a spiral development acquisition approach, fielding an initial capability, and evolving it through successive block improvements over time. The process of adapting or evolving existing technology to cope with novel threats is not new; it was at the core of the British concept to intercept V-2s during World War II and remains a great strength of today's BMDS program. Instead of following the Pentagon's more traditional requirements-based acquisition approach to engineer an optimum design over many years of development, MDA's capabilities-based approach allowed the deployment of an initial capability while recognizing the need to continuously adapt to evolving threats or improvements in technology. As such, the future BMDS is intended to be fully integrated across the threat spectrum and flexible in improving its capabilities.

Dr. Lawrence M. Kaplan
MDA Historian
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