Celebrating 60 Years of Space and Missile Defense

From launching America's first satellite to missile-busting lasers, USASMDC/ARSTRAT meets the needs of the nation, warfighters and allies.

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Sixty years of service to the nation are celebrated by the organization now known as U.S. Army Space and Missile Defense Command/Army Forces Strategic Command. It was founded Oct. 3, 1957, as the Redstone Anti-Missile Missile System Office (RAMMSO) to oversee the Nike-Zeus project, an effort to intercept intercontinental ballistic missiles. Over the decades there have been many changes as the command grew and expanded globally while assuming new responsibilities.

One constant throughout has been the mission: providing missile defense and space capabilities. The application of the mission, however, has evolved over the years falling into four phases: the Nuclear Era, a Period of Transition, an Expansion in Space and Operationalizing the Mission.

The Nuclear Era

In the period since World War II, efforts to defend the nation had addressed the threat posed by nuclear armed long-range bombers–the Nike-Ajax–and the threat of a massed bomber attack–Nike-Hercules. By the mid-1950s as the threat escalated to nuclear-armed intercontinental ballistic missiles, the Army built upon the Nike tradition and developed the Nike-Zeus system. Composed of the nuclear-tipped Zeus interceptor and five specialized radars, the Nike-Zeus system received the nation's highest priority.

Just five years after RAMMSO was created, in December 1962, the Zeus achieved the first intercept of an ICBM. Months later, Project Mudflap pitted a Zeus interceptor against an Agena D satellite. The successful intercept in May 1963 demonstrated the anti-satellite capability recently added to the Nike-Zeus mission at the direction of then-Secretary of Defense Robert S. McNamara.

Despite its successes, however, officials determined that the planned deployment was no longer sufficient to counter the anticipated threats posed by Soviet ICBMs. Although the radars represented great advances over their predecessors, there were obvious problems given the volume of the threat predicted for the late 1960s. It was believed that a saturation attack would overwhelm the discrimination capabilities of the Discrimination Radar and the Target Track Radars, and the Missile Track Radars could focus only upon one target or missile at a time. Similarly, doubts were raised about the effectiveness of a single interceptor. Instead of a deployment decision then, the program would continue as a research and development effort, known as Nike-X.

Through a series of studies, projects and tests, Nike-X improved the Zeus interceptor and developed new high-speed, high-capacity computers and radars as well as the Sprint, a new short-range nuclear interceptor. At the same time, Nike-X was assigned responsibility for the Kwajalein Test Range in the Marshall Islands, based upon the significant role that it played in the Army's anti-ballistic missile (ABM) research and development effort. During this phase the

Nike-X devised a new ABM system composed of a long-range Spartan, a short-range Sprint and two radars, the Multifunction Array Radar and the Missile Site Radar. Feasibility studies conducted in 1966 found that “Nike-X would add to U.S. deterrence and provide significant reduction in fatalities in the event deterrence fails.”

1967 was a turning point in the ABM program. In November 1966, McNamara announced that the Soviet Union had deployed an ABM system around Moscow. At the Glassboro Summit between President Lyndon B. Johnson and Soviet Premier Alexei Kosygin, the USSR refused to discontinue this program. Also in 1967, the threat posed by China was renewed as the Chinese exploded their first thermonuclear devise and launched a nuclear-tipped missile. The U.S. response came in that September, when McNamara announced the decision to deploy a light ABM system called Sentinel.

To implement this decision the Nike-X Project Office became the Sentinel Systems Command (SENSCOM) in November 1967. The Sentinel deployment had goals of defending urban and industrial areas against possible ICBM attacks by China and a possible accidental launch by any power. It also included an option to defend the Air Force’s Minuteman ICBM sites in Montana, North Dakota and Wyoming.

The Army and the SENSCOM were given 54 months to reorient the program from research and development to production and deployment. An initial deployment consisted of six Perimeter Acquisition Radars, 17 Missile Site Radars, 480 Spartan and 220 Sprint silo-launched interceptors at sites across the nation from Boston to San Francisco and Oahu. Given the political environment–opposition to the war in Vietnam and to the concept of nuclear weapons–this deployment plan was not well received.

With the inauguration of President Richard M. Nixon in January 1969, the deployment was halted as the president ordered a review of all strategic offensive and defensive priorities. In March, he announced a new program, the Safeguard. It reoriented the ABM program based upon three priorities: “to protect land-based retaliatory forces against a direct attack by the Soviet Union;” to provide a “defense of the American people against the kind of nuclear attack which Communist China is likely to mount within the decade;” and to protect “against the possibility of accidental attacks from any source.”

Now known as the Safeguard Systems Command (SAFSCOM), the command was charged to deploy this new BMD system with a first site operational within the original 54-month deadline. Ultimately ten sites were identified across the country, but construction would only begin at two sites, near Grand Forks Air Force Base, N.D., and Malmstrom Air Force Base, Mont.

Again outside forces would come into play. Even as construction proceeded, the United States and Soviet Union conducted the Strategic Arms Limitation Talks that produced the ABM Treaty. This initial agreement limited both nations to two ABM sites, one near the national capital and the other near an ICBM site. As a result, the Malmstrom effort halted in 1972.

The program proceeded in North Dakota. Officially designated the Stanley R. Mickelson Safeguard Complex, this site, with its Perimeter Acquisition Radar, missile site, radar, 30 long-range Spartan and 70 short-range Sprint interceptors and four remote Sprint launch sites, achieved full operational capability in September 1975.

Thus the command deployed the western world's first ABM system. The system was short-lived. Despite Department of Defense arguments to retain the system, the Fiscal Year 1976/7T appropriations bill provided that funds for the ABM facility were to be used for the "expeditious termination and deactivation of all operation of that facility." The Perimeter Acquisition Radar transferred to the U.S. Air Force, becoming Cavalier Air Force Station. It continues to serve today as part of the Air Force's deep-space tracking system.

Even as work progressed on the Safeguard deployment, the command received a new mission to develop a next-generation system known as Hardsite Defense, a prototype demonstration program. Soon thereafter, in May 1974, the Secretary of the Army realigned all BMD efforts under one organization, the Ballistic Missile Defense Organization. The SAFSCOM became the Ballistic Missile Defense Systems Command (BMDSCOM), and a Ballistic Missile Defense Advanced Technology Center replaced the Army's Ballistic Missile Defense Agency.

The BMDSCOM would oversee the development of the Site Defense and later a new deployment concept, the Low Altitude Defense/Sentry. Chartered in 1977, the LoAD was the last nuclear interceptor initiated by the command. Designed to protect the proposed mobile MX ICBM program, the LoAD also was deemed a feasible underlay component of a two-tiered layered defense system.

In 1982, Secretary of Defense Caspar Weinberger issued a directive to support all possible deployment modes for the MX, or Peacekeeper, missile. At the same time, he directed the development of a non-nuclear exoatmospheric interceptor. In response the LoAD became the Sentry. One year later as a result of ABM Treaty restrictions and funding constraints, BMDSCOM terminated the Sentry program.

A Period of Transition

Meanwhile, the Site Defense program came to an end in 1974 with the congressional ban on prototyping, a ban which would remain in place until 1981. During this period, the BMD program pursued two development concepts. One focused upon component improvements and a second explored innovative advanced technologies.

Component improvements took a variety of avenues. For example, can we miniaturize the interceptor, make it lighter, develop a more effective propellant and incorporate on-board sensors eliminating the need for a guidance radar? In many cases, the answer was yes. Modern interceptors are much smaller, lighter, and are equipped with their own sensors. The Airborne Surveillance Testbed put a sensor on a mobile platform, and the Designating Optical Tracker put the sensors on the missile.

In other cases, new targets and tests validated and improved identification and discrimination algorithms. The Advanced Research Center made great advances in data processing technology. At the same time, the command began to explore alternative technologies with the application of lasers and neutral particle beams to the missile defense equation and the transition to a kinetic energy interceptor.

On June 10, 1984, the Homing Overlay Experiment (HOE) demonstrated that it was possible "to hit a bullet with a bullet" by successfully intercepting an ICBM nose cone. Described as "the first major revolution in ballistic missile defenses since the . . . 1940s," the HOE collided with the target at speeds of 15,000 feet per second. Just three years later the

Flexible Lightweight Agile Guided Experiment achieved the same success with an endoatmospheric interceptor. These accomplishments combined with the evolving research in alternative technologies placed the command at the fore in the next significant phase of development.

In March 1983, President Ronald Reagan announced the Strategic Defense Initiative (SDI). He challenged the scientific community to “give us the means to render these nuclear weapons impotent and obsolete.” Mocked by detractors as the “Star Wars” policy, the SDI nevertheless evolved into a multi-service program designed to develop a treaty-compliant, non-nuclear, multi-tiered national defense system.

Based upon its extensive background in missile defense technologies, this command, which would soon be renamed the Strategic Defense Command, served as the lead in many of the new programs. In the boost-phase of the SDI architecture, the command had responsibility for the Ground Based Laser. In the midcourse phase, the Neutral Particle Beam and the Ground Based Interceptor played key roles. The Terminal Phase saw the greatest application of Army assets with the Airborne Optical Adjunct, the Ground-Based Radar, Ground-Based Surveillance and Tracking System and the High Endoatmospheric Defense Interceptor. While not all of these initiatives were successful, they served as the foundation for the current Ground-based Midcourse Defense.

Even as the command explored the SDI programs in the late 1980s, its missions continued to evolve as researchers expanded the missile defense concept to incorporate what was then called Theater Missile Defense. Is it possible to intercept a shorter-range tactical missile to defend forward-deployed forces and our allies? To address that question, the command began to develop the Extended Range Interceptor, which in 1994 was selected as the interceptor for the new Patriot Advanced Capability-3, the Theater High Altitude Area Defense and in conjunction with the government of Israel, the Arrow and the Tactical High Energy Laser (THEL).

During this same period, in 1990, the Army centralized directed-energy research by transferring the High Energy Laser Systems Test Facility (HELSTF), located at White Sands Missile Range in New Mexico, to the Strategic Defense Command. The subsequent research has taken many forms. In 1997, for example, HELSTF’s Mid-Advanced Chemical Laser and the Low-Power Chemical Laser successfully lased an orbiting Air Force satellite. This Data Collection Exercise sought to assess potential vulnerabilities given the increased dependence upon satellite systems. Later, the facility applied laser technology to the elimination of land mines and unexploded ordnance.

Most of the research has addressed the missile defense mission. From its initial tests, the THEL program enjoyed significant results. As Lt. Gen. John Costello observed following a June 2000 test in which the THEL tracked and destroyed a Katyusha rocket in flight, “We’ve just turned science fiction into reality.” By the time it transitioned to the Program Executive Office for Air, Space and Missile Defense in 2003, the mobile version of the THEL had already destroyed a variety of in-flight rockets and artillery shells.

In addition to the chemical laser, directed-energy research has explored the potential offered by a solid state laser. One product has been the High Energy Laser Technology Demonstration designed to counter multiple threats on the battlefield, specifically rockets, artillery and mortars. In 2016, the system went beyond these parameters to successfully engage unmanned aircraft systems and ground targets. The current iteration, the Mobile Expeditionary High Energy Laser, continues to incorporate upgrades in both the base and the laser.

An Expansion in Space

In the years after launching the first U.S. satellite, Explorer I, in 1958, the Army had by many accounts become a “passive consumer” of space products. Then in the 1980s, concurrent with the development of the Strategic Defense Initiative, the Army began to develop its own assets. The Army Space Institute focused upon tactical assets and bringing these to the Army at the small group level. Their tool was the Army Space Demonstration Program which brought a variety of space-based products to tactical units.

Then in 1986, the Army established the Army Space Agency, an operational unit designed to manage space functions, to represent Army’s interests with the U.S. Space Command. Two years later, it became the U.S. Army Space Command (ARSPACE). While continuing the original planning and coordination mission, ARSPACE received additional responsibilities to include a Consolidated Space Operations Center Detachment, the Army astronauts at NASA’s Johnson Space Center, three Regional Space Support Centers and soon thereafter the entire Defense Satellite Communication System (DSCS) mission.

The benefits of the 1980s space initiatives were soon realized, following Iraq’s invasion of Kuwait. The 1991 Persian Gulf War, often referred to as the First Space War, brought the assets of space to the soldier in the field. A network of GPS satellites provided position and navigation information which enabled the multinational forces to cross the open desert. Other space systems provided weather data, detailed imagery and maps, and communications capabilities. The satellites of the Defense Support Program also provided an early warning system in support of theater missile defenses.

Operationalizing the Mission

A significant change for both commands came in 1992. During that summer, the Strategic Defense Command’s program and project offices transitioned to the newly created Program Executive Office for Global Protection Against Limited Strikes. At the same time, the Army established the new U.S. Army Space and Strategic Defense Command (USASSDC), elevating the space missions to the oversight of a three-star command.

The designation reflected the command’s new role as the focal point for both Army space and missile defense. It also marked a new initiative to centralize research and development of space and strategic assets. The ARSPACE then became a subordinate command. Seven months later the Army Space Technology Research Office transferred to the command as the Space Applications Technology Program. Then in 1994, the Army Space Program Office became a major subordinate element.

The lessons learned from Desert Storm also influenced the development of the new command. The recognized benefits of a theater missile defense greatly increased the interest placed on this area of research and development. As the interceptors continued development within the PEO, the command, designated the Army’s Theater Missile Defense Advocate in 1994, addressed other elements.

The deficiencies identified in theater missile defense satellite early warning, for example, produced the Joint Tactical Ground Stations, or JTAGS. In only six years, the JTAGS, a mobile in-theater early warning station, evolved from the mission needs statement to a fielded system.

The JTAGS have provided continuous early warning support to forward deployed units in Europe and Korea since 1997.

During this timeframe, the ARSPACE was tasked to develop a deployable space support team. Originally known as Contingency Operations–Space, the teams grew to become the Army Space Support Teams, or ARSSTs. ARSSTs “have deployed worldwide to support units from battalion to theater level and all echelons in between.” The value of their contributions is readily apparent as the ARSSTs have been deployed in continuous rotation in support of the Global War on Terrorism since September 2001.

Even as the ARSSTs were developing, the command established a new unit in 1995, the 1st Satellite Control (SATCON) Battalion, the first battalion with an operational space mission. The mission itself, however, was not new. From five locations around the globe, Army personnel have managed the tactical use of the DSCS constellation since the 1960s. The ARSPACE assumed responsibility for this mission in 1988.

Subsequently redesignated the 53rd Signal Battalion (SATCON) in 2005, the battalion’s mission continues to grow with the deployment of the new and more powerful Wideband Global Satellites. At the same time, the command was designated the SATCOM System Expert for the Navy-managed Mobile User Objective System, an ultrahigh frequency constellation for small, tactical-level units.

On the technology development front, in 1995 missile defense research explored new avenues as USASSDC was directed to study aerostats as sensor platforms. The goal was to explore innovative means to improve ground-based radars and develop a means to see over the curve of the Earth. The program began in 1995 with the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor System (JLENS). The JLENS would transition to the Program Executive Office in 2001, and in 2003 the Rapid Aerostat Initial Deployment was first deployed to Afghanistan to address emerging threats. Meanwhile, research and development in high-altitude alternatives remained active within the command with such concepts as the High Altitude Airship, Long Endurance Multi-Intelligence Vehicle and HiSentinel. Ultimately in 2007 the command was designated as the Army’s specified proponent for high altitude.

In 1997, the command entered a new phase. Elevated to a major Army command, the renamed U.S. Army Space and Missile Defense Command (USASMDC) was identified as the Army specified proponent for Space and National Missile Defense and the operational integrator for Theater Missile Defense. Following this designation and in conjunction with a memorandum with the U. S. Army Training and Doctrine Command (TRADOC), USASMDC stood up the Space and Missile Defense Battle Lab, the only battle lab outside TRADOC. The lab’s mission was to perform space and missile defense experiments “to develop warfighting concepts, focus military science and technology research and conduct warfighting experiments.”

Exploring various opportunities, the Battle Lab sought to create a Synthetic Battlefield Environment which would link technology to the warfighter. The Force Protection Tactical Operations Center, for example, transitioned to the Army Air and Missile Defense Command in the late 1990s. This mission would expand in 2000 when the Army designated ARSPACE as the Army component command to support U.S. Space Command’s Computer Network Attack/Computer Network Defense missions.

The 1997 TRADOC agreement also authorized USASMDC to determine the space and missile defense requirements for Doctrine, Training, Leader Development, Organization, Materiel and Soldier Support. While the 3Y skills identifier, instituted in 1985, identified personnel with ballistic missile defense training, it was not until 1998 that the Army established a new Functional Area 40 for space operations officers. Since 1999, their numbers have grown from the original 23 to several hundred as the Army's Space Cadre has expanded to meet the Army's needs in five space mission areas: space situational awareness, space force enhancement, space support, space control and space force application. To prepare soldiers and civilians for their missions, the Future Warfare Center conducts a series of courses to address every facet of space and missile defense operations.

The National Missile Defense Act of 1999 directed that the United States would deploy as soon as technologically possible a national missile defense system. Later that year, the Army was designated the lead service for land-based missile defense.

Both of these initiatives brought further change for the command. The focus expanded beyond developing and improving the technologies to developing an organization capable of manning the new system. When the United States withdrew from the ABM Treaty in 2002, President George W. Bush observed, "I am committed to deploying a defense system as soon as possible to protect the American people and our deployed forces against the growing missile threat we face." The goal for an initial deployed capability was set for 2004.

It was also during this time that the command initiated efforts to "regularize" and "operationalize" space and missile defense. Rather than have an Army Space Command oversee these missions and functions, the command reorganized to create traditional Army units. In addition to the 1st SATCON Battalion, between 1999 and 2004 the command stood up the 1st Space Battalion, 193rd Space Battalion, 1st Space Brigade, 100th Missile Defense Brigade (Ground-based Midcourse Defense), all based in Colorado Springs, Colo., and 49th Missile Defense Battalion (GMD) located in Fort Greely, Alaska. A combination of Regular Army, Reserve and National Guard personnel, these units provide a recognizable structure to very distinct and unique missions.

Meanwhile, the U.S. Army Space and Missile Defense Command/Army Forces Strategic Command of today dates back to 2003 and Change 2 to the Unified Command Plan. Under that guidance, the command became the Army Service Component Command for a newly reorganized U.S. Strategic Command which was assigned the missions of global strike; information operations; space; command, control, communications and computers; intelligence, surveillance and reconnaissance; and integrated missile defense.

To reflect the dual chains of command–Department of the Army and U.S. Strategic Command–the command adopted the Army Forces Strategic Command name soon thereafter. The new name and relationships were formalized by General Order 37 issued in 2006.

Although USASMDC/ARSTRAT has evolved through many iterations, shaped by technological innovations, politics, budgets and international relations, the mission has remained constant. Throughout its 60-year history, the command has sought to provide the most effective missile defense and space technologies and personnel possible, to meet the needs of the nation, warfighters and allies.