ADA 2002

Yearbook

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Front Cover: A 1-62 ADA Avenger crewman prepares for action during Exercise Northern Edge 2001, Fort Greely, Alaska. Photo by Navy PH1 Spike Call.

ADA Heroes

by Maj. Gen. Stanley E. Green

One cannot reflect over the events of the past year without calling to mind the events of September 11th. The tragic nature of the flights that passengers unwittingly took to fatal destinations at first shocked our nation; then caused our nation to groan and mourn for her victims, both living and dead; and finally cause her to rise up in anger and resolve to right the wrong and battle those who would do us and our allies harm. Indeed the nations of the world rose up with us and stand by us today as, collectively, we prosecute the war on terrorism—a path upon which our President has so correctly placed us. Part of our reflections from this attack must conjure up a vision filled with awe and wonder as we contemplate the character and nobility of the many heroes and heroines that came forth. The quiet resolve, the ability to rise above self and focus on the needs of a fellow person in dire straits regardless of personal sacrifice, a strength that comes not from weight lifting, but from an inner source fed by faith—in essence a reminder of just what makes up a hero and who might be a hero. It came out in spades on the 11th. Firefighters and police officers in New York, civilians on a flight that crashed into a field in Pennsylvania, members of our Armed Forces and DOD civilians rescuing and treating the injured in the Pentagon—all stand out as heroes. Uncommon valor was common on that day.

Maj. Gen. Stanley E. Green
Chief of Air Defense Artillery

Even Hollywood scriptwriters have finally figured out the "good guys" from the "bad guys." Following three decades of mostly counter-culture movies that depicted American soldiers as either cowboys bordering on being war criminals or bumbling incompetents, motion picture studios have released a string of top-grossing movies—starting with *Saving Private Ryan* and continuing with *Black Hawk Down* and *We Were Soldiers*—that portray U.S. soldiers as heroes, as indeed they have been and continue to this day. Film critics and journalists saw the recasting of American soldiers as heroes rather than villains as indicative of a major cultural shift within our country. These movies, marveled one writer, mark "the end of Hollywood's campaign against the armed services." I think it's more a case of Hollywood reconnecting with the "real world" of uncommon valor and sacrifice being common among our soldiers and their families yesterday, today, and tomorrow.

We should remember that war is not a game, and our soldiers who are called upon to participate, whether Active, National Guard, or Reserve are not a baseball or football team. Too many profound issues hang in the balance. At the end of a game, whether won or lost, the crowd heads home knowing that their favorite team of athletes will be back on the field tomorrow. On the field of battle, however, the manner in which our great soldiers perform—whether they win or lose—really matters. It matters not in runs or points, rather it matters in lives saved or lost, nationhood intact or disintegrated, freedom or tyranny. If executed poorly the team will never be able to show up tomorrow, either on the field of battle or at home with their family. If executed properly, however, in accordance with hard-nosed training to standard, an effort that is synchronized to get the maximum effect at the right time, with the freedom to innovate and ensure destruction of our enemy, we cannot lose. American soldiers have thousands of worshipful, die-hard fans around the world—the people they've rescued from tyranny. This is why my heroes have always been soldiers and their families. Air Defense Artillery soldiers in particular are a special breed that understands the value of the joint and combined arms fight and the special orchestration required to execute to standard. They are asked to serve in distant places, many times on repeated tours of duty. They do so with the utmost of professionalism, motivation, and enthusiasm. They do so with the magnificent support of their families and loved ones. They have never let their nation down.

Therefore, I'm not surprised—just eternally grateful—that ADA soldiers, both active and reserve, are responding like heroes to America's War on Terror. Soldiers of the 3rd Battalion, 62nd Air Defense Artillery, deployed Sentinel Radars and command and control nodes to Afghanistan with the 10th Mountain Division. But ADA soldiers far from the Afghan battlefront also stepped up the operating tempo, which was already at a peacetime high. With the nation on

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YEAR IN REVIEW

Air Defense Artillery Wages War On Terror

The 9/11 attacks on New York's World Trade Center and the Pentagon signaled the beginning of America's first war of the 21st century —the War on Terror.

DoD Photo by Tech.Sgt. Cedric H. Ruslisill

"How could a plane hit the Pentagon? You have to be kidding me," thought Maj. Joseph A. Simonelli Jr. On assignment from the 69th Air Defense Artillery Brigade, V Corps, Giebelstadt, Germany, Major Simonelli had been working in the Air Defense Department office at the Pentagon the morning of September 11, 2001, when a hijacked commercial airliner slammed into the floor below. Escaping the building through smoke-filled corridors, he stood outside the building with other evacuees as the realization slowly dawned that the crash had been no accident. The United States was under attack and Simonelli, his fellow soldiers and civilian workers had just witnessed the beginning of America's first war of the 21st century—the War on Terror.

The calamitous 9/11 attacks had both obvious and subtle impacts on the "First to Fire" branch. Some air defenders saddled up to deploy with light infantry forces to battle Taliban and al Quaeda forces in the distant mountains of Afghanistan. Other air defenders found themselves performing installation and homeland security roles normally carried out by military or civilian police. At the U.S. Army Air Defense Artillery School, Fort Bliss, Texas, combat developers contemplated the potential deployment of ADA fire units to protect U.S. cities, nuclear facilities and vital assets against a repetition of the 9/11 attacks. By revealing America's vulnerability, the 9/11 terrorists also refocused the nation's attention on missile defense, both home and abroad.

Critics of our efforts to deploy an antiballistic missile system to defend the American homeland against missile attacks argued that the September 11 attacks, in which terrorists turned commercial airliners into lethal fuel-air bombs, demonstrated that ballistic missiles are not a primary threat. Others understood that the attacks only underscored the United State's vulnerability to missiles carrying nuclear, biological or chemical warheads that could inflict damage that far surpasses what we experienced on September 11.

The proliferation of weapons of mass destruction and the ballistic and cruise missiles that could deliver them pose a direct and immediate threat. After September 11, no one could harbor doubt that rogue nations or terrorist organizations would hesitate to use weapons of mass destruction against the United States, U.S. forces in overseas theaters of operations, or our allies and friends.

On December 13, 2001, President Bush formally notified Russia of his intent to withdraw the United States' from the 1972 Antiballistic Missile Treaty, which had long blocked efforts to deploy an effective homeland ballistic missile defense. "Today, as the events of September the 11th made all too clear, the greatest threats to both our countries come not from each other, or other big powers in the world, but from terrorists who strike without warning, or rogue states who seek weapons of mass destruction," President Bush said. "We know that the terrorists, and some of those who support them, seek the ability to deliver death and destruction to our doorstep via missile. And we must have the freedom and the flexibility to develop effective defenses against those attacks. Defending the American people is my highest priority as Commander in Chief, and I cannot and will not allow the United States to remain in a treaty that prevents us from developing effective defenses."

As he rallied the nation to fight the War on Terror during his State of the Union Address in January, President Bush said, "We will develop and deploy effective missile defenses to protect America and our allies from sudden attack. And all nations should know: America will do what is necessary to ensure our nation's security."

Consistent with the president's emphasis on missile defense, Secretary of Defense Donald H. Rumsfeld redesignated the Ballistic Missile Defense Organization as the Missile Defense Agency (MDA). The secretary also defined the agency's four top priorities:

- Defend the United States, deployed forces, allies and friends from ballistic missile attack.
- Employ a Ballistic Missile Defense (BMD) system that layers defenses to intercept missiles in all phases of their flight (boost, midcourse, and terminal) against all ranges of threats.
- Enable the services to field elements of the overall BMD system as soon as practicable.
- Develop and test technologies, use prototype and test assets to provide early capability, if necessary, and improve the effectiveness of deployed capability by inserting new technologies as they become available or when the threat warrants an accelerated capability

Seldom has a combat arms received its "marching orders" in such dramatic fashion. The new national security emphases on theater missile defense as well as homeland defense lent new urgency to air and missile defense programs and gave Air and Missile Defense soldiers an increasingly important role to play in the defense of the U.S. homeland, deployed U.S. forces, and allied or friendly forces, assets and population centers overseas.

The War on Terror ratcheted up the operating tempo for all of Air Defense Artillery, particularly soldiers of the 3rd Battalion, 62nd Air Defense Artillery. The 10th Mountain Division air defenders deployed Stinger teams, Sentinel radars and Air and Missile Defense Warning Systems (AMDWSs) from Fort Drum, N.Y. to Afghanistan and Uzbekistan to take part in Operation Enduring Freedom. Commanders relied on the 3-62 ADA Sentinel and AMDWSs to see the enemy if they should come, for airspace control, and to track friendly forces during Operation Anaconda, the bloody assault against Taliban forces and al Quaeda terrorists on snow-clad ridgelines overlooking Afghanistan's Shahikot Valley. On the home front, with the nation on heightened security alert, soldiers of the

President George W. Bush announced his intent to withdraw the United States from the Antiballistic Missile Treaty and made missile defense a top national priority.

1st Battalion, 44th Air Defense Artillery, 4th Infantry Division, deployed two Sentinel radars and command and control nodes from Fort Hood, Texas, to Utah to guard the Winter Olympics against potential aerial attacks. The team of 15 "Ironhorse" soldiers—Sentinel operators, technicians and a medic—set up operations in early January as part of Joint Task Force Olympics. One Sentinel perched on top of a mountain with a spectacular view of the ski jumping competition across the valley while another set up at a small airfield. The Sentinels tracked low-flying aircraft—something Federal Aviation Administration radars couldn't do—and relayed digital data to the Air Security Operations Center at a nearby airbase.

In the aftermath of the terrorist attacks, activated Army National Guard ADA soldiers provided security for nuclear power generating stations and major airports, including Chicago's O'Hare and Philadelphia International. Others prepared to deploy, or helped sister units prepare to deploy, to reinforce security operations overseas.

Sgt. Terry Smith, 1-44 ADA, a radar technician, performs a systems check on the mountaintop Sentinel site at Park City, Utah.

Photo by MSG Debra Bingham, 4th Infantry Division Public Affairs.

In the months leading up to and after September 11, ADA Patriot task forces continued their decade-long rotation to and from Southwest Asia. In March, as the Israeli-Palestinian conflict threaten to escalate into open warfare, thousands of demonstrators marched through Baghdad, burning American and Israeli flags and urging President Saddam Hussein to "hit Tel Aviv," reviving memories of Iraqi Scud missiles that hit Israel during the Gulf War. Meanwhile, military analysts warned that Saddam might launch Scud missiles, perhaps armed with chemical or biological weapons, against Israel or U.S. troops at the start of any new American campaign against Iraq.

Divisional ADA battalions continued to rotate in and out of Bosnia. Their efforts to maintain a fragile peace on an older front line in the struggle against terror may have been temporarily obscured by Operations Enduring Freedom, but were not unappreciated by sheltered civilian populations.

Meanwhile, at White Sands Missile Range, New Mexico, soldiers of our Theater High-Altitude Area Defense and Patriot Advanced Capabilities-3 test and evaluation battalions crossed their fingers a little tighter as interceptors streaked skyward to intercept incoming ballistic, cruise missiles and target aircraft. And soldiers, federal civilian workers and contractor test support personnel assigned or attached to the Missile Defense Agency, Army Space and Missile Defense Command, Army Test and Evaluation Command, White Stands Missile Range or Ronald Reagan Ballistic Missile Defense Test Site held their breath a little longer as Ground-based Interceptors erupted from their launch pads on Kwajalein Atoll.

Our warriors engaged on the technological battlefront made amazing progress on all fronts. Intercepting cruise missiles, blasting unmanned aerial vehicles with low-radar cross sections out of the sky, and killing short- and long-range ballistic missiles by force of impact, they silenced critics who had once contended the notion of "hitting a bullet with a bullet" was a fantasy. With every successful intercept, the air and missile defense systems envisioned for the Objective Force moved closer to fielding.

Meanwhile, Air and Missile Defense soldiers and units did what they always do—train. Air and Missile Defense units honed their fighting edge during National Training Center, Joint Readiness Training Center and Maneuver Combat Training Center rotations and at major exercises, such as Roving Sands, Sea Strike and Northern Edge. And they waited to be called into the fight against terrorism.

Pvt. Scott Davidson, a C Battery, 3-62 ADA Stinger gunner, stands guard at Bagram Airbase, Afghanistan.

"Osama bin Laden and his terrorists have definitely picked a fight with the wrong bunch," said Command Sergeant Major Mark C. Avery, Air Defense Artillery's top noncommissioned officer. "Duty has called, our soldiers—both Active and National Guard—have responded magnificently, as always. You see the same spirit and determination throughout the air and missile defense force. Soldiers everywhere are determined to do whatever it takes to win. It makes you immensely proud to be a soldier and wear the ADA insignia."

Army Specialist Kris M. Steward contributed portions of this article about the September 11 attack on the Pentagon.

Homeland Air and Missile Defense

by Lt. Col. Robert K. Carl

The duel between U.S. Army Air Defense Command's surface-to-air missiles and Soviet long-range bombers depicted in this scenario never occurred, but today's air and missile defense soldiers may soon assume Homeland Defense missions similar to those performed by their Cold War predecessors.

"An air strike on our soil pushes us to war. Our Army reorganizes to meet current and future requirements. The Armed Forces fight a war abroad. The services are enamored with emerging technologies. The threat of another air strike looms on the American psyche and Army and Air Force units deploy to defend key assets throughout the United States to prevent another surprise air strike."

Air defenders reading the extract above would justifiably assume the author is writing about today's current events. However, one could pick up a newspaper from the spring of 1952 and read similar comments in an article about our branch's forefathers. Our branch has defended the homeland before and we are being called upon to do it again. It is important to look at the experiences of those Cold War warriors while keeping in mind that the friendly and enemy situation has changed dramatically over the past half century.

Spec. Lucas Evans and Spec Donald Albritton, left to right, man a Sentinel C2 node at the 2002 Winter Olympics. (Photos by MSG Debra Bingham, 4th Infantry Division Public Affairs.)

In the 1950s, the United States was concerned with the possibility of an air strike from the Soviet Union. The people of our great nation responded with backyard bunkers and air raid drills in schools and communities. The Army Air Defense Command (ARADCOM) deployed Nike missile and anti-aircraft gun battalions alongside Air Force squadrons to defend cities and critical assets along the most likely Soviet air avenues of approach. When the intercontinental ballistic missile threat replaced the long-range bomber threat, ARADCOM briefly deployed a single Safeguard antiballistic missile system equipped with nuclear-armed Sprint and Spartan missiles, only to inactivate it in the mid-1970s when Antiballistic Missile Treaty restrictions made it impossible to deploy enough Safeguard systems to mount a plausible defense. The threat has remained constant in pressure over the past half century, but has changed in method and measure. Today, our focus is no longer on the former-Soviet Union, but on terrorist organizations and rogue nations capable of launching air and missile strikes on our homeland. Once again, our nation is responding to the changing methods and origins. People are more aware of their surroundings and more tolerant of lost services. Airlines and airports have tightened security. The Army is again working with the Air Force components of the North American Aerospace Defense Command (NORAD) to compliment each other's capabilities. The federal government has stepped up its efforts with the formation of the Office of Homeland Security and the cooperation among our national agencies is unprecedented in recent history.

As air defenders today, we could find ourselves deploying to defend Washington, D.C., a nuclear power plant, a chemical storage facility or an upcoming special event. Soldiers with Sentinel radars from the 1st Battalion, 44th Air Defense Artillery, were dispatched this winter to assist in safeguarding the Olympics from a mountaintop overlooking Salt Lake City. As part of Joint Task Force-Olympics, these soldiers supported the Federal Aviation Administration (FAA) and the U.S. Customs Service.

The "Vigilant and Invincible" soldiers of ARADCOM in the 1950s were called upon to do the same—defend critical assets in the United States. Our "First to Fire" soldiers of today will face many of the same challenges as our predecessors. There are certain aspects of the ARADCOM that must be emulated by today's force. It is important that we do not relearn their lessons the hard way. Junior leaders of ARADCOM found themselves faced with building sites, establishing public relations, and maintaining a wartime mentality in a peacetime environment. They ensured a baseline quality of life for their soldiers by erecting facilities such as mini-PXs, mailrooms, recreation centers and gyms. These leaders worked closely with local officials and established great working relationships with people who were not accustomed to a military presence near their homes. The unit leadership implemented operational readiness evaluations (OREs) and states of readiness (SORs) so the soldiers were keenly aware that their mission was vitally important to the nation and needed to be met 24 hours a day, seven days a week.

Though we do not expect full time deployments throughout the United States, our air and missile defense leaders of today may do many of the same tasks—tasks we have not practiced too often on our home ground—that our Cold War predecessors performed. Let us learn from the soldiers of the ARADCOM. I encourage you to read Colonel (retired) Stephen Moeller's historical work,

Vigilant and Invincible, about the ARADCOM on the Air Defense Artillery School homepage at http://147.71.210.23/vigilant. Let us engage those regimental honorary colonels and command sergeants major and other retirees from that era about their experiences. The German philosopher G.W.F. Hegel once said: " The only thing we learn from history is that we learn nothing from history." Let us prove Hegel wrong.

But history does not provide all the answers to today's questions. In many ways, the current situation is very different from the situation 50 years ago. The threat is not known, nor located. Though the airline industry has improved security dramatically since September 11th, the focus of the effort has been on commercial airliners. Not as much effort has gone into safeguarding against the more than 220,000 general aviation aircraft located in the continental United States, where about 150,000 of these are owned for personal use. When we couple this information with the potential for ship-launched cruise missiles or unmanned aerial vehicles, we begin to scratch the surface of the complexity of the task that lies ahead. The most difficult challenge may be winning the confidence of the American people. The soldiers of ARADCOM, renowned for their spirit and discipline, succeeded admirably in this endeavor. "Chicago is loaded for bear—even the Russian bear if the Reds should ever dare send their bombers to attack the city," declared the *Chicago American*. "A ring of sword-like guided missiles called the Nike stands ready to send sudden death belting into the sky to meet any enemy head on. They are inescapable by any air maneuver now known to aviation. The thing you ought to remember is that the Nike's presence hereabouts should enable you to sleep a lot more soundly. They make nice neighbors."

However, our task may be more difficult. Airline passengers in the 1950s did not worry about hijackers, much less becoming the target of friendly interceptors. In 1988, the *USS Vincennes* accidentally shot down an Iranian passenger jet and just last year a U.S. radar plane watched as a Peruvian military fighter shot down a private plane that turned out to be ferrying missionaries rather than narcotics. Establishing failsafe rules of engagement and convincing the public that these rules will work will be a paramount concern.

Timeliness of response is probably the most difficult technical problem to overcome. In early January, we were amazed to hear that 15 year-old Charles Bishop took off from Clearwater, Florida, in a Cessna aircraft, flew over MacDill Air Force Base and crashed into a 42-story building in downtown Tampa Bay. The event showcased the difficulty of detecting, identifying as hostile, and intercepting a civilian aircraft in a timely manner.

Though our sensitivity has heightened since 11 September 2001, we are tempered by our past. Approximately two years before Bishop's event, another aircraft took off from Central Florida heading toward Dallas. Air traffic controllers lost radio contact shortly after take off and noticed the plane was flying off course, heading straight for the nation's mid-section. Fighter jets were scrambled. This time the plane was a Learjet carrying golfer Payne Stewart and four others. All five were apparently incapacitated. There was no hostile intent, but the aircraft was clearly violating airspace use. The jet crashed into a field in South Dakota, killing all aboard. The above examples highlight the complexity of sharing timely information between law enforcement, the FAA, and NORAD. A violation of restricted or prohibited airspace itself does not constitute hostile intent. A stolen plane coupled with airspace violations and proximity to a defended critical asset could be enough to constitute consideration of hostile intent – but we can only act in a timely manner if the information is processed quickly with a shared situational understanding.

For our nation's forces to have such situational understanding, we must continue to focus in on our branch's vision for the Objective Force and Army Transformation. We minimally meet today's homeland air defense requirements with current capabilities. Tomorrow we must be more responsive, deployable, lethal, agile, versatile, survivable, and sustainable than today. Systems such as the Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) and Surface-Launched Medium Ranged Air-to-Air Missile (SLAMRAAM) systems joining our force will allow us to be more proactive—to see first, understand first, and act first. In addition to these systems, the Missile Defense Agency expects to deploy the first Ground-based Missile Defense prototype missiles in 2004. These are exciting times for our branch, but technology is only part of the solution.

Our generation has grown accustomed to fighting war on the other guy's land. Times have changed. We find ourselves not only in a joint fight, but one that is very much inter-agency. Our new partners are the FBI, Customs, FAA, Secret Service and local law enforcement. We need now, more than ever, dynamic leaders and soldiers competent in the interagency and joint environment, comfortable with ambiguity, and innovative in finding unique solutions to these very complex challenges. Be one of these dynamic soldiers and leaders. Our country needs you.

Lt. Col. Robert K. Carl is assigned to the Air Defense Battle Lab Concepts Office, Fort Bliss, Texas.

Weapon Systems Update

September 11 Attacks Reshape Air and Missile Defense

Newer, more sophisticated weaponry will increase ADA firepower, but ADA soldiers will remain the most potent weapon in the ADA arsenal

Secretary of Defense Donald H. Rumsfeld elevated the Ballistic Missile Defense Organization to agency level and re-designated it as the Missile Defense Agency (MDA). The MDA has been charged to develop a missile defense system of systems capable of defending all types of targets—from foxholes to homeland—against all types of missile threats.

The agency's overall missile defense objectives are to establish a single program to develop an integrated missile defense system, assign the best and brightest people to this work and apply a capability-based requirements process for missile defense. The military departments will procure and provide for missile defense operations and support.

Ballistic Missile Defense

All ballistic missiles share a common, fundamental element: they follow a ballistic trajectory that includes three phases: the boost phase, the midcourse phase, and the terminal phase. The boost phase is the portion of a missile's flight in which it is thrusting to gain the velocity needed to reach its target. This phase usually last between three to five minutes. During this phase the rocket climbs against the earth's gravity and either exits the earth's atmosphere, or in the case of shorter-range missiles, only reaches the fringes of outer space. Once the missile has completed firing its propulsion system, it begins the longest part of its flight, which is known as the mid-course phase. During this phase the missile is coasting, or freefalling—while still gaining speed—towards its target. This phase can last as long as 20 minutes in the case of intercontinental ballistic missiles (ICBMs.) Most missiles that leave the atmosphere shed their rocket motors by this time in order to increase the range that the missile's weapon, known as a warhead, can travel. For medium- and long-range missiles this phase occurs outside the earth's atmosphere. The final phase of a missile's flight is the terminal phase. The missile's warhead re enters the atmosphere at speeds that may exceed 2,000 miles per hour. The terminal phase lasts approximately 30 seconds for ICBM class missiles.

Layered missile defenses that attack the missile in all phases of flight multiplies engagement opportunities. Intercepting a missile in the boost phase can destroy a missile regardless of its range or intended aim-point and provide a global coverage capability. A midcourse intercept capability can provide wide coverage of a region or regions, while a terminal defense protects a localized area. Improving the odds of intercept becomes critical when ballistic missiles carry weapons of mass destruction.

Ballistic Missile Defense System

The fundamental objective of the Ballistic Missile Defense (BMD) program is to develop the capability to defend the forces and territories of the United States, its allies, and friends against all classes of ballistic missile threats. The Department of Defense will develop technologies and deploy systems promising an effective, reliable, and affordable missile defense system. The program is designed to develop effective systems over time by developing layered defenses that employ complementary sensors and weapons to engage threat targets in the boost, midcourse, and terminal phases of flight and to deploy that capability incrementally.

Boost Defense Segment

The mission of the Boost Defense Segment (BDS) is to define and develop Boost Phase Intercept missile defense capabilities that progressively reduce "safe havens" available to hostile states. Safe havens are regions from which states can launch a missile safely out of range of a potential boost phase intercept. Engaging ballistic missiles in this phase requires quick reaction times, high confidence decision-making, and multiple engagement capabilities. Higher power lasers and faster interceptor capabilities would reduce the size of safe havens, whereas development of viable space-based systems could potentially eliminate them entirely. Thus, resources have been allocated to develop kinetic- and directed-energy capabilities to provide multiple engagement opportunities that will reduce time and geographic constraints.

There are four principal BDS objectives. First, demonstrate and make available the Airborne Laser. Second, define and evolve space-based and sea-based kinetic-energy Boost Phase Intercept concepts over the next two to four years, supporting a product line development decision in 2003-2005. Third, execute a proof-of-concept Space-Based Interceptor Experiment. Fourth, continue Space-Based Laser risk reduction on a path to a proof-of-concept Space-based Laser Integrated Flight Experiment in 2012. At appropriate times, the MDA will insert mature system concepts and technologies into product line development and deployment.

Midcourse Defense Segment

The Midcourse Defense Segment (MDS), formerly known as National Missile Defense, develops increasingly robust capabilities for countering ballistic missiles in the midcourse stage of flight. The MDS program of work is divided into multiple elements including Ground-based Midcourse Systems, and Sea-Based Midcourse Systems–the successors to the National Missile Defense and Navy Theater Wide programs–segment Systems Engineering and Integration, and segment Test and Evaluation.

Within the MDS, the bulk of the resources are designed to build and sustain an operationally realistic test architecture that represents the envisioned operational capability. The Missile Defense Agency plans to have an RDT&E ground based test bed available in the 2004-2006 time frame. As designed, this test bed will expand to enhance overall test infrastructure and system maturation, although its initial development will occur within the midcourse segment. Over time the test bed will expand to include weapons and sensor capabilities from throughout the BMD System as they become available. Moreover, upon availability, the test bed

Air and Missile Defense Systems

SLAMRAAM

Patriot

Sentinel

Stinger

THAAD Radar

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A Ground-based Interceptor erupts from its launch pad and streaks toward an intercept point high above the earth's atmosphere.

could incorporate air-launched targets, thereby providing geographically realistic scenarios and improving overall testing realism. Throughout, enhancements will be made to both the Fort Greely and Kodiak Island test facilities in Alaska, improving both target and interceptor launch capabilities.

Ground-Based Midcourse

The Ground-based Midcourse Defense (GMD) system will intercept missiles primarily during the descent phase of midcourse flight. The GMD system scored its third straight successful intercept in less than a year on March 15. An exoatmospheric kill vehicle (EKV), carried aloft from the Ronald Reagan Ballistic Missile Defense Test Site on Kwajalein Atoll by a modified Minute Man II booster, intercepted a target missile launched from Vandenberg Air Force Base, California. President Bush's decision to withdraw America from the Antiballistic Missile Treaty has removed diplomatic barriers to system development and deployment, and the GBD system, buoyed by the recent string of successful intercepts, is moving toward operational capability just two years from now.

The Department of Defense awarded contracts on April 12 to begin building a GBD missile test site at Fort Greely. Five Ground-Based Interceptors using a precursor of the objective booster and an operationally representative EKV will be developed for installation and testing in 2004. These five prototype missile interceptors, together with their battle management and communications infrastructure, should be in place by October 2004. The Ground-based Interceptors will be test models, but could stop an incoming missile.

During FY 2002, the GMD element will build upon its string of successful intercepts by further demonstrating hit-to-kill and discrimination capabilities using increasingly complex and realistic test scenarios. The Missile Defense Agency will continue to develop the objective booster and continue with complementary kill vehicle activity, an objective that may produce a common EKV for Ground- and Sea-based Midcourse Defenses.

Air Defense Artillery soldiers—primarily Army National Guardsmen—will man Ground-based Interceptor launch facilities. In effect, they will reassume a homeland defense mission similar to the one that Nike, Nike Hercules and Nike Ajax soldiers of the Army Air Defense Command performed in the 1950s and 60s when the primary threat was long-range Soviet bombers rather than long-range ballistic missiles.

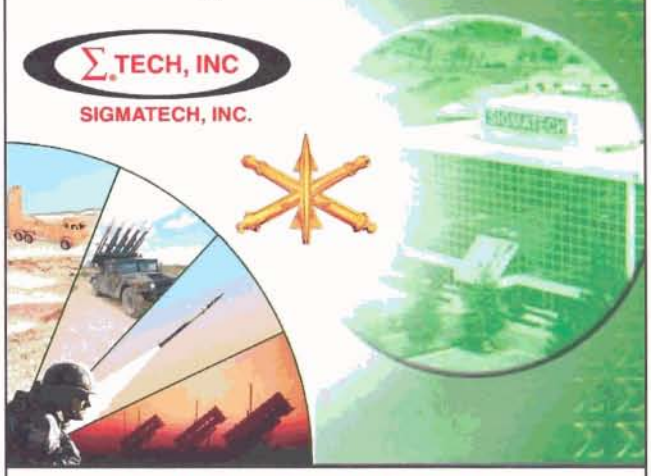
Sea-Based Midcourse

The Sea-based Midcourse System will join the Ground-based System to complete the midcourse layer of missile defense. By engaging missiles in early ascent, sea-based systems also will reduce the overall BMD System's susceptibility to countermeasures. The Sea-based Midcourse System will build upon technologies in the existing Aegis Weapon System and the Standard Missile infrastructures and will be used against short- and medium-range threats.

Terminal Defense Segment

The Terminal Defense Segment involves development and upgrades of missile defense capabilities that engage short- to medium-range ballistic missiles in the terminal phase of their trajectory. Missiles or warheads enter the terminal phase when they reenter the atmosphere. Terminal Defense Segment elements include the Theater High Altitude Area Defense (THAAD) system, Patriot Advanced Capability- 3 (PAC-3) system, Medium Extended Air Defense System (MEADS) and a sea-based terminal concept definition element that is successor to the Navy Area missile defense program. Other elements funded by the Missile Defense Agency are the Israeli Arrow Deployability Program, which include the

Systems Engineering and Technical Assistance . . . in support of AMD Transformation



Capabilities and Products for the Future

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The Theater High-Altitude Area Defense system consists of truck-mounted launchers, interceptors, radar system and, at left, a Battle Management/Command, Control, Communications and Intelligence system.

Israeli Test Bed, Arrow System Improvement Program, and studies via the Israeli Systems Architecture and Integration effort that assess the Arrow performance relative to both existing and emerging threats.

While the Missile Defense Agency sets national ballistic missile defense priorities, major commands below agency level and the individual services continue to exert a decisive influence. For example, the U.S. Army Air Defense Artillery School continues to define ADA requirements, write battlefield doctrine and train units and soldiers to employ the air and missile defense systems described in the following section—with the exception of Israel's Arrow Weapon System.

Theater High-Altitude Area Defense System

The Theater High-Altitude Area Defense (THAAD) system will protect U.S. and allied armed forces, broadly dispersed assets, and population centers against missile attacks, intercepting short- and medium range ballistic missiles at significant distances from the intended target and at high altitudes. The system's long-range and high-altitude intercept capabilities will give U.S. forces the best chance to shoot down incoming ballistic missiles far enough out so that post-intercept debris will not harm our troops—a vital consideration if a missile carries a weapon of mass destruction. Furthermore, this ability will give our Ballistic Missile Defense (BMD) forces time to judge the success of an intercept attempt and, if necessary, launch more interceptors from THAAD or other missile defense systems. As part of a layered missile defense architecture, THAAD provides near leak-proof protection when employed, for example, with lower-tier systems such as Patriot or Sea-Based Terminal systems.

The THAAD system consists of four principal segments: truck-mounted launchers, interceptors, the THAAD radar system, and the THAAD Battle Management/Command, Control, Communications and Intelligence (BM/C3I) system. The mobile launcher will protect and transport the interceptors, in addition to firing them. With its palletized load system, the launcher can be rapidly reloaded. Interceptors will consist of a single stage booster and a kinetic kill vehicle that will destroy targets by the force of kinetic energy—"hit-to-kill." The THAAD radar will support the full range of surveillance, target tracking and fire-control functions, and provide a communication link with THAAD interceptors in flight. Finally, THAAD's BM/C3I system will manage and integrate all THAAD components by providing instructions, communications, and by processing sensor data. The BM/C3I system also will link the THAAD system to other missile and air defense systems, and to our maneuver forces to support a multi-tiered, highly effective, interoperable BMD architecture. Transportability has been a key design issue from the start—with the exception of certain radar components, all system elements are transportable by C-130 aircraft.

THAAD is well along its development timetable. THAAD system development started in 1992, and the Army expects to field the system to Air Defense Artillery around 2007 or 2008. In the meantime, THAAD is undergoing rigorous testing and development.

Eleven flight tests were conducted during the Program Definition and Risk Reduction phase, culminating in two successful body-to-body intercepts in the summer of 1999. On June 10, 1999, during Flight Test10 (FT-10), hit-to-kill intercept of a unitary target in the high endoastmosphere was achieved. During FT-11 on August 2, 1999, a second intercept was achieved—this time against a separating target in the exoatmosphere. (The endoatmosphere ends and the exoatmosphere begins 60 miles above the ground.)

The THAAD program was subsequently approved for entry into Engineering and Manufacturing Development (EMD) during a June 2000 Milestone II review. Design and development work continues with periodic segment-level Critical Design Reviews (CDRs) scheduled through 2003 and a system-level CDR set for early FY2004. Flight testing will resume in late 2004 at White Sands Missile Range, New Mexico, eventually transitioning to the Ronald Reagan Ballistic Missile Defensex Test Site sometime in 2005.

Current efforts are addressing component and system performance, ease of production, and supportability. A robust ground-testing program will precede flight testing, currently planned for FY 2004. The budget adds resources to accelerate acquisition of a THAAD radar and to buy more test missiles in order to capitalize on early flight test successes.

Patriot Advanced Capability-3

The Patriot Advanced Capability-3 (PAC-3) missile is a high-velocity, hit-to-kill missile developed to provide an increased capability against advanced tactical ballistic missiles, cruise missiles, and hostile aircraft. The PAC-3 missile, which has a proven track record of successful hit-to-kill intercepts, will provide critical operational capability to defend our forward-deployed forces, allies, and friends. The system is designed to counter enemy defense suppression tactics that may include tactical ballistic missiles, anti-radiation missiles, and aircraft employing advanced countermeasures and low radar cross-section.

U.S. Patriot battalions hastily equipped with Patriot Advanced Capability-2 missiles defended Saudi Arabia and Israel against Iraqi Scud missile during the Gulf War. They successfully engaged and intercepted incoming Scuds, but the PAC-2 intercepts—achieved by proximity blast fragmentation—frequently failed to destroy the Scud's warheads, which fell to earth with post-intercept debris and exploded on contact with the ground. Unlike previous Patriot missiles, the PAC-3 uses an active radar seeker and closed loop guidance to directly hit the target, destroying the warhead by kinetic force.

With the PAC-3 missile and ground system, threat missiles can be engaged and destroyed at higher altitudes and greater ranges with better lethality. The system can operate despite electronic countermeasures. Due to the active seeker and closed loop guidance, a greater number of interceptors can be controlled at one time than with the earlier Patriot missiles. Increased interoperability allows better coordination between fire units and battalions as well as better integration with other air defense assets. Inherent to the program is the incremental fielding of updated equipment to provide incremental increases in capability.

During the most recent operational test, conducted in late March 2002, a PAC-3 missile launched by soldiers of the 2nd Battalion, 43rd Air Defense Artillery, successfully intercepted and destroyed an incoming tactical ballistic missile while a PAC-2 missile obliterated a target aircraft. Following the successful intercepts, the Pentagon awarded Lockheed Martin Corp. and Boeing Co. a $327 million contract for continued low-rate initial production of PAC-3 missiles. Lockheed Martin Missile and Fire Control, a unit of the Bethesda, Maryland-based company, will carry out 64 percent of the work on the Patriot PAC-3 missile contract, with the remainder going to Chicago-based Boeing. Operational testing and evaluation continues to support a full-rate production decision. The first PAC-3 missiles will be delivered to training battalions this year.

Medium Extended Air Defense System

The Medium Extended Air Defense System (MEADS) is a transatlantic cooperative effort between the United States, Germany and Italy to develop a tactically mobile and transportable air and missile defense system capable of countering tactical ballistic missiles and air-breathing threats, including cruise missiles. MEADS will provide limited area defense of vital assets, both civilian and military, while its mobility will enable MEADS units to protect maneuver forces.

The MEADS will defend maneuver forces and fixed assets from short-range ballistic missiles, cruise missiles and other air-breathing threats such as aircraft or unmanned aerial vehicles. Its role in the ballistic missile defense architecture will be to bridge the gap between manportable systems such as the Stinger and upper-level missile defense systems such as the Theater High-Altitude Area Defense system while providing continuous coverage for rapidly advancing maneuver forces. The system's commonality of design will contribute to the interoperability of U.S. and allied forces.

Mounted on a wheeled vehicle, MEADS will use a multi-canister vertical launcher to protect and launch its interceptors. Advanced radars will provide 360-degree coverage. Initially, MEADS will employ hit-to-kill PAC-3 missiles against Theater Ballistic Missiles (TBMs) and a lethality-enhanced warhead against air-breathing targets. State of the art communications equipment will link all components and access a broad range of sensors from other systems and services.

A distributed, netted architecture and module components will enable commanders to task-organize and configure MEADS to plans of operation and anticipated threats. MEADS will also decrease U.S. strategic lift requirements for theater missile defense systems.

MEADS reaffirms the United State's commitment to stay involved in European security affairs and could spark a renaissance in trans-Atlantic cooperation. The German Parliament recently made funding available to continue the trilateral activity, and the program is about to embark on a three-year Risk Reduction Effort.

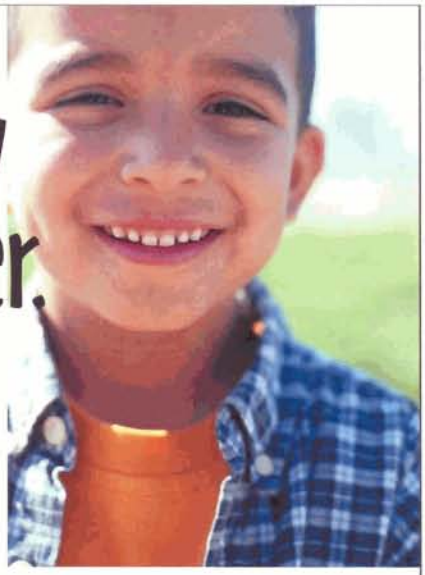
The MEADS project will pass through three phases: Product Definition and Validation, Design and Development, and Production. The Product Definition and Validation phase will produce system specifications, a primary end item specification document, and a cooperative plan for common development and production. Participating countries will negotiate a memorandum of understanding for each phase.

Low-rate initial production could start in 2009. Following operational testing and evaluation, MEADS could reach the field as early as 2012. Once deployed, MEADS will provide robust, 360-degree protection for maneuvering forces and other critical forward-deployed assets against short- and medium-range missiles.

Managed by the NATO MEADS Management Agency (NAMEADSMA), MEADS is a model transatlantic development program focused on the next generation of air and missile defense. MEADS will focus on risk reduction, application of key technologies and validation of a system design incorporating the PAC-3 missile.

Arrow Weapon System

The Arrow Weapon System (AWS), developed jointly by the United States and Israel, provides Israel a defense against short- and medium-range ballistic missiles and helps ensure U.S. freedom of action in future contingencies. Arrow also provides protection against ballistic missile attacks for U.S. forces deployed in the region. Israel declared the system operational in October 2000 following a successful intercept test on September 14, 2000. The Arrow Deployability Program also supports Israel's acquisition of a third Arrow battery and Arrows' interoperability with U.S. Theater Missile Defense systems. Interoperability will be achieved via a common communication architecture utilizing Link-16. The Arrow System Improvement Program will include both technical cooperation to improve the performance of the AWS and a cooperative test and evaluation program to validate the improved AWS performance. The United States will support additional flight-testing and supply of components to be built in Israel. Continued cooperation is expected to provide insight to Israeli technologies that may be used to enhance U.S. ballistic missile defense systems.



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The U.S. Army Air Defense Artillery School continues to define air and missile defense requirements for Divisional Air Defense. It also writes battlefield doctrine, tactics, techniques and procedures, and trains units and soldiers to employ the Division Air Defense systems (elevated and ground sensors, C4, and weapons) that are described in the following sections.

Divisional Air Defense

The Army has scheduled Air Defense Artillery's Avenger Slew-to-Cue modifications and Bradley Linebacker programs for cancellation in FY 2003. These two are among 18 Army legacy programs selected for cancellation from FY 2003 to FY 2007 to help pay for Army Transformation. However, the cancellation doesn't mean that the Avenger and Bradley Linebacker are exiting the force. They will continue to serve, along with the Bradley Stinger Fighting Vehicle, Manportable Stinger and the Sentinel Radar, as mainstays of Divisional Air Defense until around 2020.

In the case of the Bradley Linebackers, the cancellations mean no more new platforms will be produced to replace the Bradley Stinger Fighting Vehicles that remain in many divisional units. Units that have fielded Bradley Linebackers will not lose them; these vehicles will remain in the fleet. Likewise, the loss of funds for Avenger modifications does not indicate an impending reduction in the Avenger force. The Slew-to-Cue Avenger modifications were designed to resolve some obsolescence issues and provide the enhanced capability of a sensor-to-shooter link. Originally intended to be implemented fleetwide, only the active elements of III Corps and 3rd Battalion, 265th Air Defense Artillery, Florida Army National Guard, will now receive the Slew-to-Cue modifications.

By modifying the 18 legacy programs, the Army expects to save approximately $3.4 billion over the next four years—money that will help support the transition to the Objective Force and to Future Combat Systems. In keeping with the Army's vision for transformation, the air and missile defense leadership at the U.S. Army Air Defense Artillery School have worked diligently to develop a campaign plan to guide air and missile defense modernization. As part of that strategy, Objective Force AMD units will be able to detect and destroy enemy unmanned aerial vehicles or attacking aerial threats at extended ranges to allow ground forces to operate without hindrance from aerial threats. The system identified to fill that role, and to eventually replace Divisional Air Defense legacy systems, is the Surface-Launched AMRAAM (SLAMRAAM).

Armed with HMMWV-mounted Advanced Medium-Range Air-to-Air Missile (AMRAAM), the SLAMRAAM system can be adapted to a variety of platforms. With four times the range of the Stinger missile, the SLAMRAAM can defeat current and future threats, and its deployability, lethality, and versatility are a perfect fit for the Objective Force. The SLAMRAAM will enable our Divisional Air Defense forces to conduct line-of-sight, beyond-line-of-sight, and non-line-of-sight engagements. Equipped with a robust sensor network and Forward Air Defense Command, Control, Communication, Computers and Intelligence (C4I) software, the system has both centralized and decentralized engagement control and engage-on-remote capability. As a tri-service missile (Army, Air Force, and Marines), the maintenance costs of the missile will be shared, thereby reducing the life cycle costs and system logistical footprint.

To gain funding, the Directorate of Combat Developments, U.S. Army Air Defense Artillery School, made approval of the SLAMRAAM Operational Requirements Document (ORD) top priority during the preparation of the Program Objective

The SLAMRAAM, left, will eventually replace Division Air Defense legacy systems, including the Bradley Linebacker, center, and Avenger, right

Memorandum (POM), a decisive phase of the acquisition procurement and development cycle. On Feb. 19, the U.S. Army Training and Doctrine Command forwarded the SLAMRAAM ORD to Headquarters, Department of the Army, for approval.

The Army expects to begin fielding SLAMRAAM in the FY 2005 to FY 2008 timeframe. The system will be phased in as our Legacy Force systems are slowly phased out. Since the SLAMRAAM system will not be fully fielded to the active force until approximately 2015, the Army will continue to rely on our Stinger-based force—Avenger, Bradley Linebacker, Bradley Stinger Fighting Vehicle, and Manportable Stinger teams—for the next decade. The challenge to ADA commanders, leaders, and soldiers in the field is to continue to train and maintain with our legacy platforms until SLAMRAAM is fielded to the total force.

Scheduled hardware upgrades will enable Stinger to meet the evolving air threats of the new century.

Stinger-RMP

Manportable Stinger systems smuggled across the Pakistan border into Afghanistan during the Soviet occupation blunted the effectiveness of Soviet attack helicopters and close-combat support aircraft. Historians credit the shoulder-launched missile system with turning the tide of war in favor of Afghan freedom fighters. During the Gulf War, the Army, Navy, Air Force and Marine Corps deployed Stinger teams to defend maneuver forces, provide high-value site defense, and protect key political and industrial facilities.

Today, Stinger-RMP—the acronym refers to the system's new reprogrammable microprocessor —continues to provide superior air defense for today's highly mobile forces. Stinger-RMP is a lightweight, self-contained air defense system that can be rapidly deployed on a variety of military platforms. (Air Defense Artillery's Avenger and Bradley Linebacker launch Stinger missiles while Bradley Stinger Fighting Vehicles ferry manportable Stinger teams into combat. U.S. airborne and light divisions deploy Avengers and manportable Stinger teams.)

Stinger's unique fire-and-forget technology—the gunner is free to take cover immediately after launch or engage additional targets—maximizing survivability and combat effectiveness, even in a heavy countermeasure environment. Its combination of supersonic speed, agility, highly accurate guidance and control system, and lethal warhead gives Stinger the operational edge against all classes of helicopters, unmanned aerial vehicles, and fixed-wing aircraft.

Stinger uses a two-color, infrared-ultraviolet detector and advanced algorithms for enhanced countermeasure discrimination. The capability to reprogram fielded hardware ensures that tomorrow's combat forces will be equipped with state-of-the-art weaponry to defeat evolving threats. Scheduled hardware upgrades will enable Stinger to meet the evolving threats of the new century.

FAAD C4I

The mention of Air Defense Artillery invariable conjures up images of blazing missile launches and the bright explosion of intercepts as surface-to-air missiles find their targets, but the Forward Area Air Defense Command, Control, Communications, Computers and Intelligence (FAAD C4I) system may be the "First to Fire" branch's most indispensable weapon system. The FAAD C4I system consists of the Sentinel Radar and command and control nodes centralized in a HMMWV-mounted Air and Missile Defense Work Station (AMDWS). The Sentinel is the air surveillance and target acquisition and tracking sensor for division and corps air and missile defense. It detects and tracks low-flying aircraft, helicopter, unmanned aerial vehicle, and cruise missile targets—something that other battlefield sensors can't do—and relays digital target data to the AMDWS, which disseminates the data via FAAD data link to air defense weapon system and combined arms and joint or multinational C4I systems throughout the battlefield.

Maneuver force commands rely on Sentinel to complete a composite picture of the aerial battlefield with no "blind spots." A 10th Mountain Division Sentinel Radar helped Operation Anaconda commanders keep track of friendly insertions and extractions during the assault on Taliban forces and al Quaeda terrorists during Operation Anaconda.

The three-dimensional phased-array system operates in the X-band to automatically detect, track, identify, classify, and report airborne threats, including helicopters, high-speed attack aircraft, cruise missiles, and unmanned aerial vehicles. It detects and tracks threat aircraft at several times the distance of short-range weapons. Sentinel's early warning capabilities protect personnel and equipment by allowing engagement of threats at maximum distances.

Sentinel is accurate, quick reacting, and acquires targets far enough from friendly troops to provide sufficient reaction time for their air defense weapons to engage the targets at optimum range. The system configuration allows weapons, radars, and command posts to operate from widely separated battlefield positions.

The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) enhances wide-area protection against land attack cruise missiles, while supporting secondary missions.

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Sentinel command posts activate weapon control orders and provide target weapon pairing. The Sentinel includes an integrated identification friend or foe (IFF) capability that helps prevent fratricide.

In April, soldiers of the 1st Battalion, 204th Air Defense Artillery, Mississippi Army National Guard, demonstrated the capability and benefits of powering the Sentinel Radar from a new power source—the Hybrid Electric HMMWV—during a live operational training exercise at Camp Shelby, Mississippi. The demonstration included radar emplacement, start-up, and full-power operation of the radar with the system's engine off (silent stealth mode, battery power only), and with the diesel engine running (alternator cycling in and out, re-charging the batteries). A Sentinel Radar powered conventionally by a mobile electric power unit "handed-off" an air defense mission to the hybrid system's radar, which provided continuous ADA "air intelligence" to two operating Avenger batteries without interruption.

PEI Electronics of Huntsville, Alabama, provided the Hybrid Electric HMMWV to support the demonstration, which was cosponsored by Mississippi State University and the Mississippi Army National Guard. The Radar Power Technology research program is managed by the U.S. Army Space and Missile Defense Command.

Joint Land Attack Cruise Missile Defense Elevated Netted Sensor

The Joint Land Attack Cruise Missile Defense Elevated Netted Sensor (JLENS) is a tactical, theater-based, advanced sensor system that enhances wide-area protection against land attack cruise missiles, while supporting secondary missions. The system is elevated by tethered aerostats to enable battlefield commanders to increase their wide-area protection against land attack cruise missiles.

The JLENS will provide the long endurance (up to 30 days on station), over-the-horizon detection and tracking capability required to defeat the proliferating cruise missile threat. This cost-effective system complements fixed-wing assets and reduces the pace of aircrew missions. Its presence in the battlespace will allow reallocation of costly manned aircraft to support other critical missions. JLENS is a multi-mission system that contributes to the single integrated air picture and supports other secondary missions such as combat identification, communication relays, and attack operations.

JLENS is currently in the Program Definition and Risk Reduction phase of development. A JLENS System Development and Demonstration phase and Production phase will follow. JLENS is scheduled for initial fielding to ADA units in FY 2010.

Air and Missile Defense Planning and Control System

The Air and Missile Defense Planning and Control System (AMDPCS) will provide the Army Air and Missile Defense task forces a C4I system with automated capabilities to enhance joint interoperability and air battle management in Joint Theater Air and Missile Defense. The AMDPCS supports the digitization of the AMD battlefield by providing airspace situational awareness, automated command and control and an automated staff and mission planning capability.

The AMDPCS is an integrated C4I system, which includes both Force Operations and Engagement Operations components. The AMDPCS is being developed using standard Army Common Hardware and Software products, standard shelters, and common U.S. Army and U.S. Air Force communications equipment. AMDPCS will use the Joint Tactical Terminal (JTT) and the Joint Tactical Information Distribution System (JTIDS) as part of the communications suite.

The Tactical High-Energy Laser demonstrator has destroyed more than 25 Katyusha rockets in flight during tests conducted during 2000 and 2001.

The already fielded Air and Missile Defense Work Station (AMDWS) serves as the Force Operations component of the AMDPCS, providing integrated defense planners and shared database software. The defense planning function includes a tactical mission planner that displays weapons engagement zones and sensor coverage, and provides a "shot opportunity" analysis capability for Divisional Air Defense units. It also displays and/or provides enemy order of battle information, terrain analysis and nuclear, biological and chemical analysis.

The AMDWS supports commanders at all air and missile defense echelons. Computer displays allow them to view the air picture and access databases for situation reports; enemy assessments, friendly force status, and maneuver control overlays. AMDWS provides an embedded training simulation capability that replicates those situations encountered in actual mission operation. The software is being developed in blocks. Evolving software capabilities are added throughout the AMDWS development cycle.

AMDWS is currently integrated with Divisional Air Defense weapons, Patriot PAC 3, and JLENS for maximum common functionality. Future plans include integration with THAAD and MEADS. The AMDWS gives the Army air and missile defense commander an automated interface with the Joint Defense Planner as well as with the Air Force Theater Battle Management Core Systems for joint collaborative defensive planning. AMDWS also provides coalition interfaces to systems such as the German Surface-to-Air Missile Operations Center (SAMOC) via the Low Level Air Picture Interface (LLAPI).

The Air Defense Systems Integrator (ADSI) will serve as the Engagement Operations component of AMDPCS at the brigade level and Army air defense command level, while the FAAD Engagement Operations (EO) hardware and FAAD C2 software enable EO for corps and divisional air and missile defense forces. The ADSI and FAAD EO components enable fire control coordination for engagement operations. The ADSI component enables fire control coordination for engagement operations. AMDPCS components, except for commercial software, are provided as government-furnished equipment to all ADA systems from battery to theater level.

Joint Tactical Air and Ground Station

Operating with new generations of infrared satellites, the Joint Tactical Air and Ground Station (JTAGS) will provide TBM launch tactical parameters—launcher grid coordinates, target area and time of impact—and warning of other tactical events to entire theaters of operation. The JTAGS Multi-Mission Mobile Processor (M3P) will relay launch data via direct down-link from Space-base Infrared Satellites to defended assets C4I centers, and elements responsible for executing Active and/or Passive Defense and Attack Operations.

JTAGS data will permit missile defense fire units to optimize TBM engagements and Field Artillery units to target Multiple Launch Rocket System fire missions at the launch sites. The Air Force and Army Aviation could use JTAGS data to scramble fighters and attack helicopters to take out mobile TBM launchers.

A normal JTAGS detachment will consist of two M3Ps. The first JTAGS MP3s should reach Army units in late FY05.

Tactical High Energy Laser

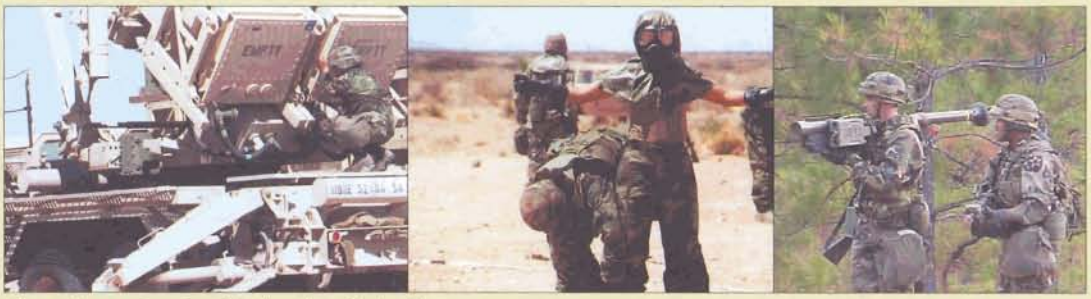
"While the idea that lasers could be used effectively to conduct lethal engagements was promoted vigorously during the heyday of President Reagan's Star Wars program in the 1980s, the reality of using high energy lasers in killing systems has finally come of age," wrote retired Lt. Gen. Jay M. Garner, a former Chief of Air Defense Artillery, in an article titled "Fighting at the Speed of Light" published in the February 2002 issue of *Army* magazine. "The U.S. Army Space and Missile Defense Command has developed and tested a high energy laser air defense system as part of the joint United States-Israeli Tactical High Energy Laser (THEL) advanced concept technology demonstration that is designed to engage and destroy enemy rockets in flight."

The ability to use high-energy lasers against short-range rockets was previously evaluated in the Nautilus program, an outgrowth of Project Strong Safety, in collaboration with Israel. The Nautilus program was conducted primarily at the U.S. Army Space and Missile Defense Command's High Energy Laser Systems Test Facility (HELSTF) at White Sands Missile Range. After a series of static and dynamic tests, the program successfully destroyed a short-range rocket in flight on February 9, 1996. The Nautilus success triggered the joint THEL development effort with Israel.

In April 1996, the then Prime Minister of Israel, Shimon Peres, met with President Bill Clinton and then Secretary of Defense William Perry. As a result of these meetings, the U.S. made a commitment to assist Israel in the development of a THEL demonstrator to help Israel defend its northern cities from the threat posed by Katyusha and other short-range rockets.

In July 1996, the U.S. Army Air Space and Missile Command awarded a contract to TRW for design, development and fabrication of a transportable, tactical-sized THEL demonstrator. The effort includes development and testing of a high-power laser/fluid supply assembly; the pointer/tracker; a command, control, communications and fire control system; modification of and interface with a radar provided by Israel; limited aspects of support equipment; and field testing in the United States.

Over a period of four years, the system has been designed, built, and has now entered field testing at the HELSTF at White Sands Missile Range. The system



Commanders remain convinced that the caliber of their soldiers is more important than the caliber of their weapon systems.

has already demonstrated the capability to detect, acquire, track, and point the laser against operational Katyusha rockets in flight. The THEL demonstrator has destroyed more than 25 Katyusha rockets in flight during tests conducted during 2000 and 2001. Completion of the field testing of the THEL demonstrator at HEL-STF is a crucial step before delivery of the system to Israel.

If successful, the demonstrator may pave the way for future collaboration with Israel in the development of a mobile THEL, which could lead to new missile and air defense capabilities for the U.S. Army and Israel. Cost will run only a few thousand dollars per kill or less, with a deep magazine to counter saturation attacks.

A U.S. Army Air Defense Artillery School's Air and Missile Defense Operational and Organizational Concept White Paper published in 2001 envisions laser- or directed-energy systems replacing or supplementing Divisional Air Defense legacy systems as the Army moves toward the Objective Force. The future systems' target list would include short-range rockets, unmanned aerial vehicles, and mortar and artillery rounds.

Air and Missile Defense Soldiers

Today's air and missile defense weapon systems are more than a match for the air threat in any theater of operations. In fact, integrating U.S. Air and Missile Defense systems with less sophisticated allied and friendly equipment on multinational battlefields is a major challenge. This hasn't always been the case. In 1917, soldiers of the newly formed U.S. Army Antiaircraft Service, hastily recruited from the ranks of the Coast Artillery Corps, embarked from the Port of New York for the trenches of the Western Front. They arrived without antiaircraft weapons—which they had to borrow from the French—but they quickly established a reputation for lethal marksmanship and coolness under fire.

None of the remarkable advances in 20th century battlefield technology ever convinced astute commanders that the caliber of their weapon systems was as important as the caliber of their soldiers—a conviction still rampart among 21st century commanders. Air Defense Artillery is blessed with soldiers of exceptionally high caliber. Newer, more sophisticated weapon systems will continue to improve ADA firepower, but ADA soldiers will remain the most potent weapons in the ADA arsenal.

Portions of this article were extracted from the Missile Defense Agency website. Contributors include Major Kelvin S. Hutchison and CW4 John R. Carnell of the U.S. Army Training and Doctrine Command Project Office for Short-Range Air Defense and Command, Control, Communication, Computers and Intelligence (C4I).

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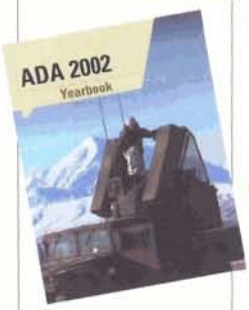

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heightened security alert following the September 11 attacks, ADA Stinger teams and a Sentinel Radar were dispatched to President Bush's Crawford, Texas, ranch to guard against potential aerial attacks during Russian President Vladimir Putin's visit. The 1st Battalion, 44th Air Defense Artillery, deployed Sentinel Radars to safeguard the Winter Olympics.

"Year in Review: ADA Wages War on Terror" on page 4 gives a more detailed synopsis of the many important roles that ADA soldiers are playing in Operations Enduring Freedom and Noble Eagle. The article briefly describes the tremendous work ADA soldiers accomplished as they took on the battle against Taliban forces, focused on homeland security missions, tested and evaluated new air and missile defense systems, participated in major exercises, and continued peace-keeping operations in Bosnia and Southwest Asia. But you have to read between the lines to fully appreciate the dedication, devotion to duty and professionalism displayed by the men and women who wear the ADA insignia.

"We know that the terrorists—and some of those who support them—seek the ability to deliver death and destruction to our doorstep via missile," said President Bush last December, as he announced his decision to withdraw the United States from the Antiballistic Missile Treaty, a move that removes barriers to the continued development of missile defense systems to defend the American homeland from long-range ballistic missile attack. But the War on Terror has made theater missile defense as well as homeland missile defense top priorities.

Today, Air Defense Artillery is optimally positioned to complete its transition to the Objective Air and Missile Defense (AMD) Force, a transition that will enable the branch to fully capitalize on leap-ahead technologies and retain its current warfighting advantages while denying similar advantages to potential enemies. On Dec. 5, 2001, the Commanding General, U.S. Army Training and Doctrine Command, approved the AMD Operational & Organizational Concept. We are scheduled to brief our concept to the Department of the Army in the near future. This game plan envisions a transformation to a more flexible, more deployable AMD force and the incremental replacement of our legacy systems with more capable systems, including lasers or directed-energy based weapons that will permit us to add mortars, artillery and short-range rockets to our target list (see "Weapon Systems Update," page 8).

We've also won approval of many recommendations resulting from the most recent ADA Functional Review, including the opening of more AMD military occupational specialties to women, converting some of our ADA officer slots to ADA warrant officer positions, and a fine-tuning of assignment processes that will give ADA soldiers a greater variety of assignment opportunities and more equitable promotional opportunities.

"What the Future Holds for Air and Missile Defense Soldiers" by Lt. Col. Barry G. Halverson, in the May 2002 update of ADA Magazine Online (http://147.71.210.21/adamag) offers a more detailed explanation of ongoing ADA personnel management initiatives that are enhancing job satisfaction for ADA soldiers.. Also in the May 2002 update, you can find an article titled "Air Defense Artillery in Support of the Corps: Emerging Doctrine in Integrating and Synchronizing Air and Missile Defense," by Maj. Michael F. Tronolone Jr., the 108th ADA Brigade's assistant operations officer. Our Internet magazine has become our primary format for articles and debate about air and missile defense issues. These two articles are prime examples of the type of articles that ADA soldiers and NCOs should regularly be contributing to our Internet branch journal, which has become our primary format for debate and discussion on AMD issues.

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Following our success with the AMD Operational and Organizational Concept and Functional Review, we have launched a full-court press to take these two efforts and move further ahead by building the AMD Campaign Plan. The ADA Campaign Plan is a doctrine, training, leader development, organization, materiel, and soldiers plus facilities (DTLOMS+F) micro-level of detail document that puts all the pieces together and depicts how the today's AMD Force over time will transform to the Objective AMD Force. The campaign plan ensures that we won't neglect our most important asset—top-quality soldiers—in our rush to field urgently needed weapon systems. Thanks to our wonderful soldiers, America is winning both the War on Terror and the race to field more effective air and missile defense systems before our opponents can develop delivery systems and weapons of mass destruction that would tilt the strategic balance in favor of the terrorists.

A lot has been going on in our branch, our Army, and our nation over this past year and much work remains to be done. Your help and assistance is most valuable during this time of our transformation. I want to thank every one of you, whether Active, National Guard, or U. S Army Reserve, retired military, or civil servant for your service and dedication. I know that I'm not the only one who appreciates you and thinks of you as heroes. A recent national poll once again put the United States military at the top of the list of those most respected in our nation. You have made it so, and I know you will continue to do so. God bless each and every one of you.

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