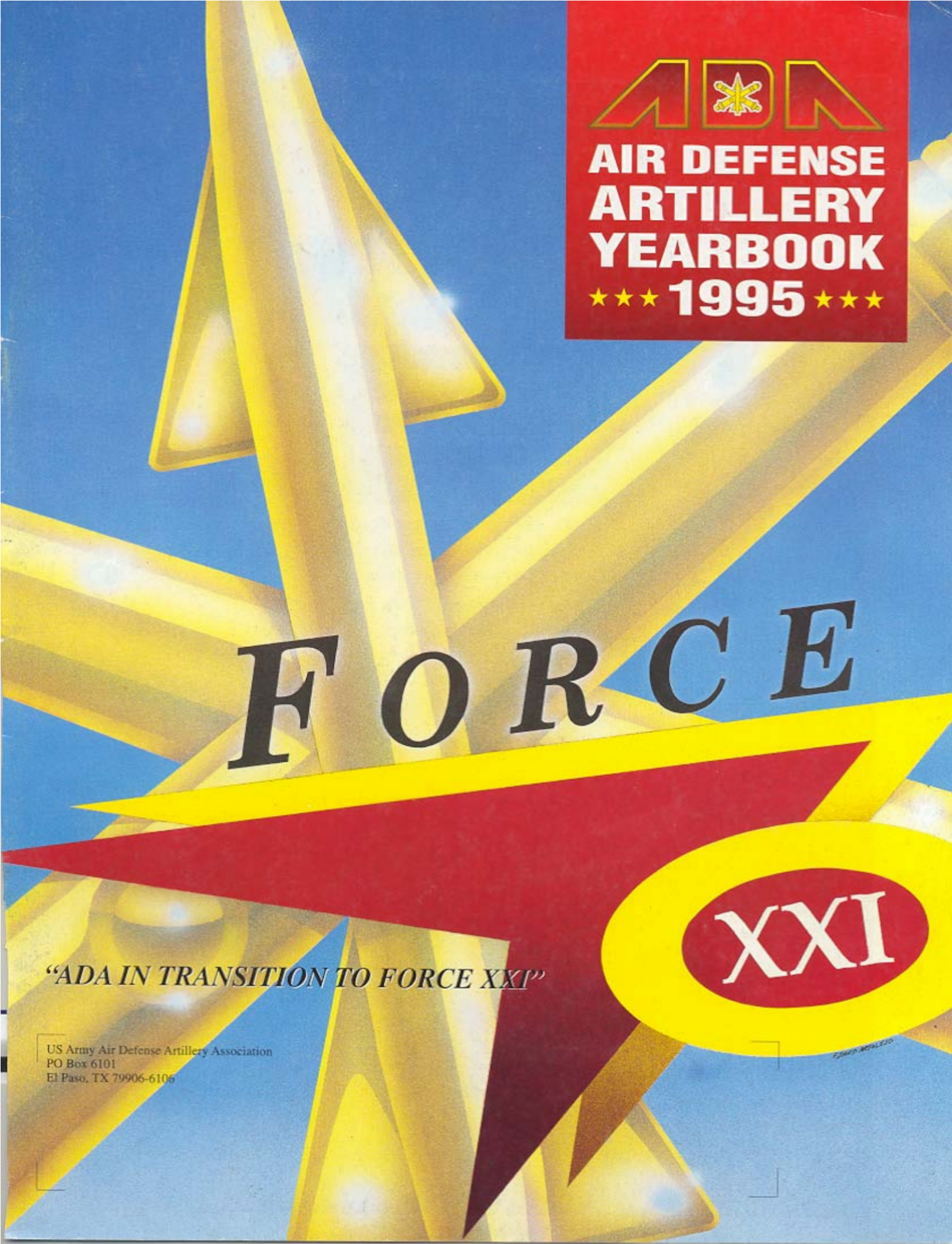
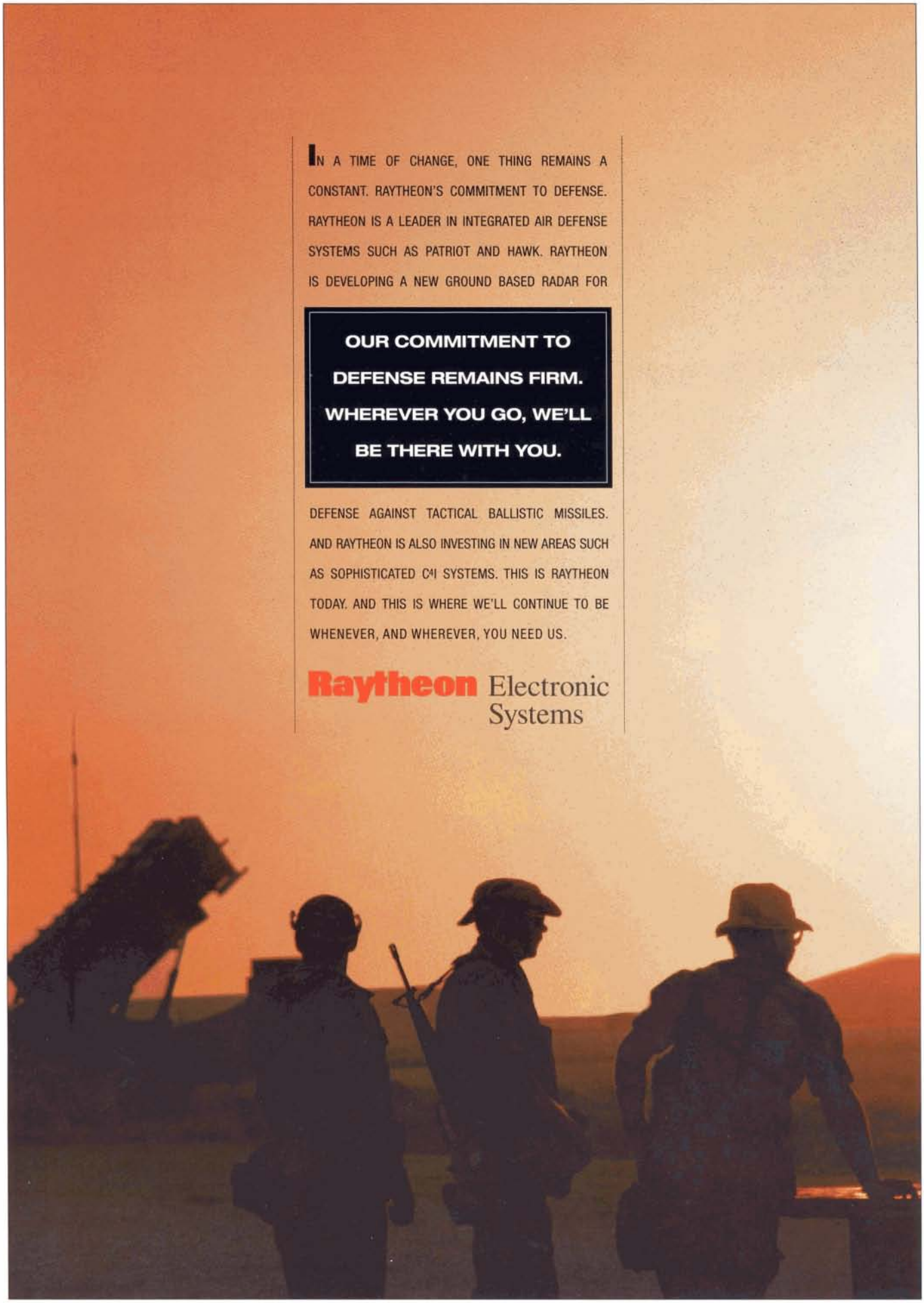

ADA
AIR DEFENSE ARTILLERY YEARBOOK
1995
FORCE
XXI
"ADA IN TRANSITION TO FORCE XXI"
US Army Air Defense Artillery Association
PO Box 6101
El Paso, TX 79906-6106


IN A TIME OF CHANGE, ONE THING REMAINS A CONSTANT. RAYTHEON'S COMMITMENT TO DEFENSE. RAYTHEON IS A LEADER IN INTEGRATED AIR DEFENSE SYSTEMS SUCH AS PATRIOT AND HAWK. RAYTHEON IS DEVELOPING A NEW GROUND BASED RADAR FOR
OUR COMMITMENT TO DEFENSE REMAINS FIRM. WHEREVER YOU GO, WE'LL BE THERE WITH YOU.
DEFENSE AGAINST TACTICAL BALLISTIC MISSILES. AND RAYTHEON IS ALSO INVESTING IN NEW AREAS SUCH AS SOPHISTICATED C4I SYSTEMS. THIS IS RAYTHEON TODAY. AND THIS IS WHERE WE'LL CONTINUE TO BE WHENEVER, AND WHEREVER, YOU NEED US.
Raytheon Electronic Systems

AIR DEFENSE ARTILLERY YEARBOOK 1995

Cover design and illustration by David Artalejo

AIR DEFENSE ARTILLERY YEARBOOK 1995

S T A F F

PUBLISHER
Joanne Gwinn Burt

EDITOR-IN-CHIEF
Blair Case

EDITOR
Lisa B. Henry

ART DIRECTOR
Terry G. Smith

PRODUCTION
David Artalejo

GRAPHIC DESIGNS
Angel Quezada

ADVERTISING SALES
Randy Rogers
915-542-0103

ADA ASSOCIATION

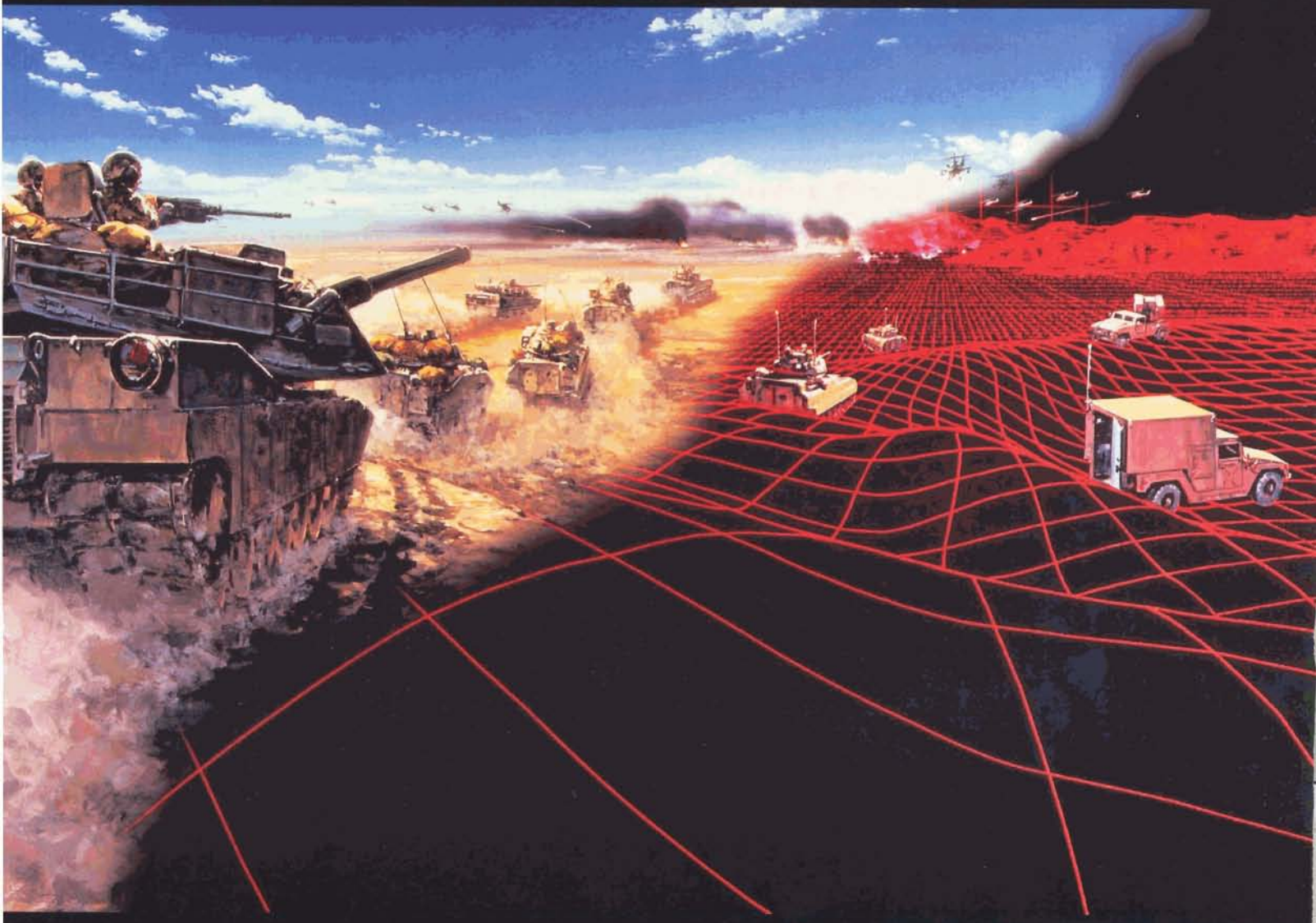
PRESIDENT
Brig. Gen. Ernst Roberts
(Retired)

DIRECTOR
Col. Charles W. Hurd Jr.

SECRETARY
Edith Fanning

TRW

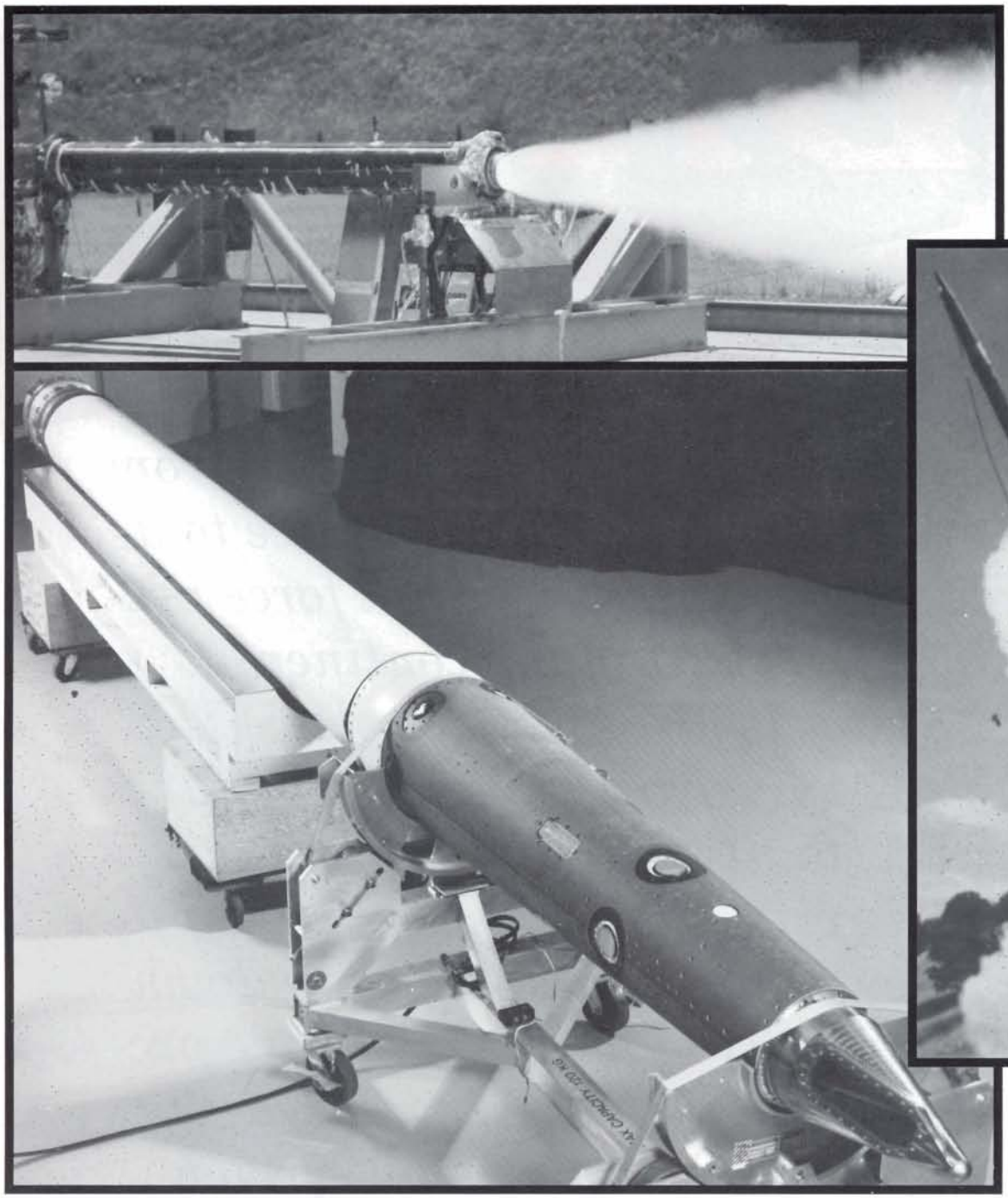
FAAD C^2I:



First on the Digital Battlefield

THAAD PROPULSION

Single Stage Solid Propellant Booster with Thrust Vector Control



UNITED TECHNOLOGIES CHEMICAL SYSTEMS

Supporting the THAAD Flight Test Program

UNITED TECHNOLOGIES CHEMICAL SYSTEMS

an operating unit of Pratt & Whitney Space Propulsion Operations

MAKING THE ADA TRANSITION

ADA VI

The transformation of the U.S. Army from a Cold War, forward-deployed force to a post-Cold War, power-projection force predominantly based in the continental United States is virtually complete. The end of the Army drawdown and the turmoil, uncertainty and disruption it entailed is near at hand. Despite frequent contingency deployments, the drawdown has been carefully managed. We have preserved, and in many ways increased, our combat power even as we have grown smaller. Now is the time to look ahead, and we can look to the future with confidence, for we are an Army armed with a vision of the future.

To Force XXI

SION

BY MAJ. GEN. JAMES J. CRAVENS JR.
CHIEF OF AIR DEFENSE ARTILLERY

The photo at right shows cavalry troopers charging "hell-for-leather" across a Fort Bliss, Texas, training range. It may, at first, seem curious that I have chosen such a photo to illustrate an article about the future of the Army and Air Defense Artillery. But something is terribly wrong with this photo. Taken in 1942, it captures the spirit of the cavalry, but it also illustrates a lack of vision, a failure of imagination. The American Civil War, a century earlier, proved that cavalry charges had no place in modern warfare. But months after Pearl Harbor, the U.S. Army was still practicing cavalry charges as if the combustion engine had never been invented, as if machinegun rounds had never zinged through the barbed wire of World War I, as if a mechanized blitzkrieg hadn't recently rolled across Europe.

The photo of charging cavalry is a picture of the past juxtaposed upon the present. My purpose in using the photo is not merely to demonstrate that we have, at times, been slow learners, but also to dramatize the breaking of a chain — a chain that, in the past, has made disaster the child of victory.

"The moment of greatest peril is the moment of victory," said Napoleon. It's a lesson Americans have learned the hard way. America has repeatedly celebrated victory by dismantling the military force that made victory possible. The "next war," as a result, always caught the nation unprepared for effective action. Military budget cuts that proved popular in peacetime led, in wartime, to a needless waste of lives. Politicians were blamed, but the Army was also at fault. Lulled by victory into complacency, blinded by branch parochialism, saddled rather than inspired by tradition, the peacetime Army grew moribund. It ignored its visionaries and court-martialed its mavericks.

Today, America is withdrawing its victorious forces from the perimeters of the Cold War. Once again our adversaries are in defeat and disarray. Once again the nation has set about reducing the force that made victory possible. Now may be our moment of greatest peril, but we have learned from the mistakes of the past and are taking deliberate measures not to repeat them.

Today's Army, unlike the Army of the past, has institutionalized change by encouraging, rather than stifling, innovation. It is an Army with a vision, a vision that serves us as an azimuth to the future. That vision is called Force XXI, the Army of the 21st century. The vision recognizes that emerging information technologies will "pierce the fog of battle" and transform warfare in the 21st century in much the same way that gunpowder and the industrial revolution transformed warfare in previous centuries. The central and essential feature of Force XXI will be its ability to exploit information at all echelons across all battlefield operating systems . . . an ability that will increase its combat power by an order of magnitude. It will be critically dependent upon the exploitation of space assets across the entire spectrum of military operations. Force XXI will have the inherent capability to decisively defeat an armored or mechanized force, and will possess the ability to counter a potent theater missile threat to which we are most vulnerable in the future.

The creation of Force XXI involves the reconceptualization and redesign of the force at all echelons, from the foxhole to the industrial base, to meet the needs of a volatile, ever-changing world. Force XXI is a journey, not a destination; a journey we have already begun. We will take with us the fundamental values and enduring traditions that have long sustained our Army on the battlefield, but nourish them in a joint and combined environment.

The Army has initiated the Force XXI Campaign Plan to create the

Army of tomorrow. The campaign plan incorporates three complementary and interactive efforts. The first and most important effort, called "Joint Venture," is the redesign of the force. The new 10-division Army will consist of four light divisions (light infantry, airborne and air assault) and six heavy divisions (mechanized infantry and armored). New doctrine, concepts and processes already in place provide the foundation for the redesign of the force. Re-engineering the division is Joint Venture's initial focus. Producing the best operating force is its end goal. The second and supporting effort is the re-invention of the "institutional" Army, that part of the Army that generates and sustains the operating forces. The third part of the campaign plan concentrates on the development and acquisition of information-age technologies, particularly our digital communications and hardware and the related software needed for information-age battle command.

The campaign plan incorporates a series of advanced warfighting experiments (AWEs), advanced technology demonstrations and advanced concept technology demonstrations. Examples in Air Defense Artillery are experiments (such as the Tactical Missile Defense AWE) and demonstrations (such as the Patriot Integrated Diagnostics Support Demonstration) that will be conducted or assessed in operational environments. Proof of principle for high-risk and high-return concepts will be demonstrated during a program called Advanced Concept Technology II. Concepts that show merit will be incorporated into training exercises and demonstrations.

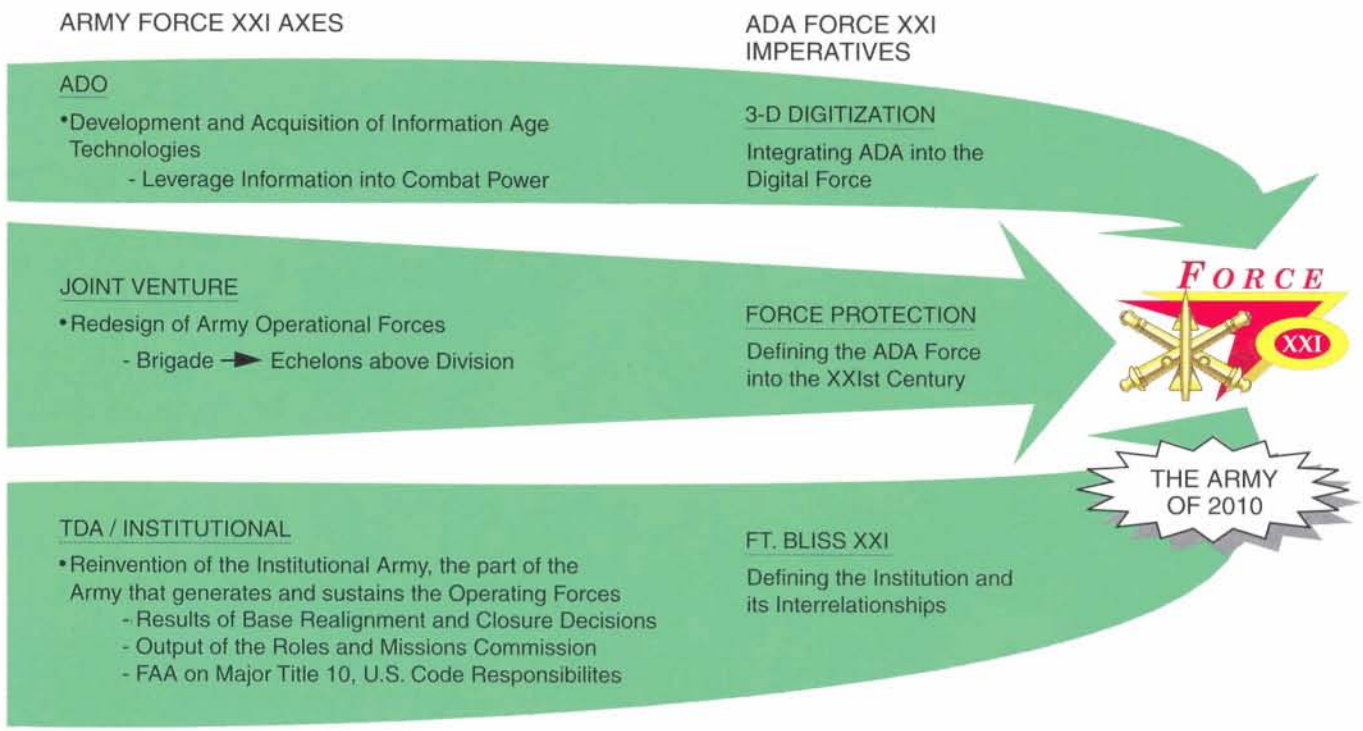
Force XXI experiments and demonstrations will, in effect, overlay the future upon the present. They will focus first on the brigade, then the division and then the corps. Together, they will teach us how to leverage technology and give us insights to guide us in making force design decisions as well as informed and timely resource decisions. Force XXI time lines will permit us to make force design, development and procurement, and fielding decisions by the year 2000. The transition to ForceXXI should be complete by 2010. Our challenge is to remain trained and ready while growing more capable as we make the transition to Force XXI.

Air Defense Artillery has its own vision embedded within the total Army vision. This vision is described in depth in "Air Defense Artillery: Maintaining Relevancy in the 21st Century Army," which begins on page 9.

The vision is that of a strategically deployable, highly mobile and agile ADA force that will provide force protection on the move for Force XXI. It will be modular and tailorable. New weapon systems designed to counter the emerging tactical ballistic and cruise missile threat and a flexible doctrine based on joint and integrated operational concepts will make ADA Force XXI highly lethal against multiple threats. The Theater High-Altitude Area Defense System, Corps Surface-to-Air Missile and Patriot PAC-3 will rely on integrated detection and track data from a variety of sensors mounted on elevated and ground platforms as well as their organic sensors. Together with forward area air defense systems, they will provide a near-leakproof defense against advanced theater ballistic and cruise missiles. Information technology will permit ADA units to share battlefield knowledge vertically and horizontally.

The ADA force of the 21st century will consist of superbly equipped, trained and ready organizations led by knowledgeable, top-quality leaders and soldiers. In the 21st century, junior ADA officers and NCOs, assisted by automated decision aids at all echelons, will have greater battlefield situational

Road To Force XXI



ADA IMPERATIVES PARALLEL FORCE XXI CAMPAIGN AXES

awareness than senior commanders had in the 20th century.

The ADA vision will be tested and refined by experimentation during the transition to Force XXI. The result will be an expanded role for Air Defense Artillery, and we will fight to make our vision become reality.

The recently created ADA Force XXI Board at the Air Defense Artillery School will coordinate and oversee the ADA Force XXI Campaign Plan depicted in the chart above. The crucial series of AWEs that will shape Force XXI have the potential to do for Air Defense Artillery what the Louisiana Maneuvers, conducted on the eve of World War II, did for Armor. The ADA Force XXI Board will make sure the First to Fire branch makes the most of a great opportunity. The board will ensure that ADA participation in Force XXI AWEs is relevant, prioritized, adequately resourced and focused on ADA Force XXI goals.

The ADA Force XXI Board will work to ensure the First to Fire branch doesn't lose in after-action reviews and assessments what it wins on the simulated battlefield. It will see that concepts and doctrine spun off by the AWEs are consistent with high-payoff lessons learned during the conduct of AWEs. The board will ensure that requirements to address projected Force XXI capability shortfalls are identified in appropriate documentation. It will make sure all ADA programs critical to creating ADA Force XXI are reflected in the U.S. Army Training and Doctrine Command's Warfighting Lens Analysis and Army research, development and acquisition plan, and that these programs are placed in competition for program objective memorandum funding. The board is also tasked to ensure all ADA Force XXI training is focused and complies with the Army's Force XXI training vision.

We have, and will retain, quality soldiers who have the skills, determination and dedication required to make ADA Force XXI a reality. Today, the senior officers and NCOs who will lead ADA Force XXI are enrolled in officer basic courses and NCO academies. For them, 2010 will be not an objective but a phase line, a new jumping-off point into the future. The chain of victory followed by disaster will have been broken. Tomorrow's soldiers will be thoroughly indoctrinated with the spirit of innovation and the doctrine of change. They will remember the past and find strength in our heritage and traditions, but they will never forget the future. They will ensure that 21st century Air Defense Artillery continues to be —

First to Fire!

Maintaining Relevancy in the 21st Century Army

FORCE XXI

by Maj. Gen. James J. Cravens Jr.

"The world has changed." This phrase holds enormous implications for nations, governments and, in particular, the profession of arms.

> ***George Santayana said, "Those who cannot remember the past are condemned to repeat it."***

Our current national military command authorities understand this famous quote. The Army Chief of Staff is committed to breaking the "hollow force" syndrome that has followed all major 20th century conflicts. This country must never again dismantle its military forces after a major conflict. We won the Cold War, but must avoid the temptation to relax our military readiness and capability as we have in the past. Air Defense Artillery is a key component of breaking that cycle. We will break the cycle by intellectually adapting to our new environment while simultaneously sustaining the fundamentals: doctrine, leadership, training, organization, professionalism and prudent modernization.

In these times of change the Air Defense Artillery branch must have a direction, an azimuth . . . a road to ensure relevancy in tomorrow's Army. What follows is a vision for Air Defense Artillery in the Army of the future.

WORLD SITUATION AND THREAT

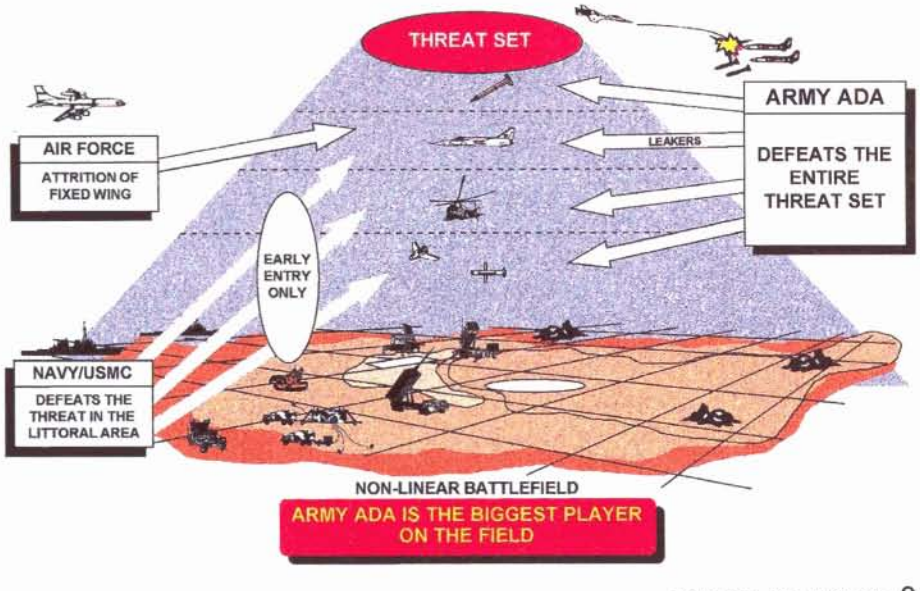
The world is an extremely dangerous place, in many respects more so than it was during the Cold War era. Many nations are acquiring technologically advanced, highly lethal weapons that can threaten U.S. and allied forces and vital assets. Third-dimension platforms include ballistic missiles, unmanned aerial vehicles (UAVs), cruise missiles, armed helicopters, manned aircraft and tactical air-to-surface missiles. Combined with technologies such as stealth, low observables, accurate guidance and unconventional (mass casualty) warheads, they present a significant threat to warfighting commander in chief's (CINCs) assets that Air Defense Artillery must protect.

The missile threat to U.S. forces around the globe is significant and growing. Tactical ballistic missiles (TBMs), even when used in small numbers, may have a significant impact on a joint force commander's campaign plan. Gen. H. Norman Schwarzkopf knew the Iraqi Scud threat was tactically insignificant; however, he knew that strategically it presented a challenge to the Gulf War coalition's cohesiveness. Clearly, a more numerous or a more effective ballistic missile capability in the hands of a determined adversary could have both military and geopolitical implications.

More than 25 countries already have some TBM capability, and experts expect that number to increase significantly by the end of the decade. The growing variety of potential warheads these missiles may carry further challenges our ability to counter them. If uncountered, TBMs (particularly those armed with mass casualty warheads) limit U.S. national command authority options.

The success of U.S. Tomahawks in Operation Desert Storm validated the tactical and operational effectiveness of cruise missiles on the battlefield. Cruise and tactical air-to-surface missile technology is for sale today and will proliferate in this decade and into the 21st century. Russia, France and the United States are but a few countries that currently produce cruise missiles. Several other countries possess the technology to produce airframes for cruise missiles that, when combined with guidance and control technology available on the market, could present

AERIAL THREAT TRENDS



a significant threat. Cruise and tactical air-to-surface missiles provide a comparatively inexpensive means of delivering a variety of warheads. Such missiles present a growing threat to deploying U.S. forces and our allies.

Helicopters have been a mainstay aerial platform throughout the world since the early 1950s. Their versatility and survivability make them ideal for logistics resupply, air assault, command and control, and heavily armed weapons platforms in an attack role. Helicopters currently exist in every potential theater and were among the first platforms Iraq used in its invasion of Kuwait. U.S. helicopters were highly successful in Operation Desert Storm as tank and radar killers, command and control platforms and air assault platforms. We can expect future adversaries to learn from our Gulf War success.

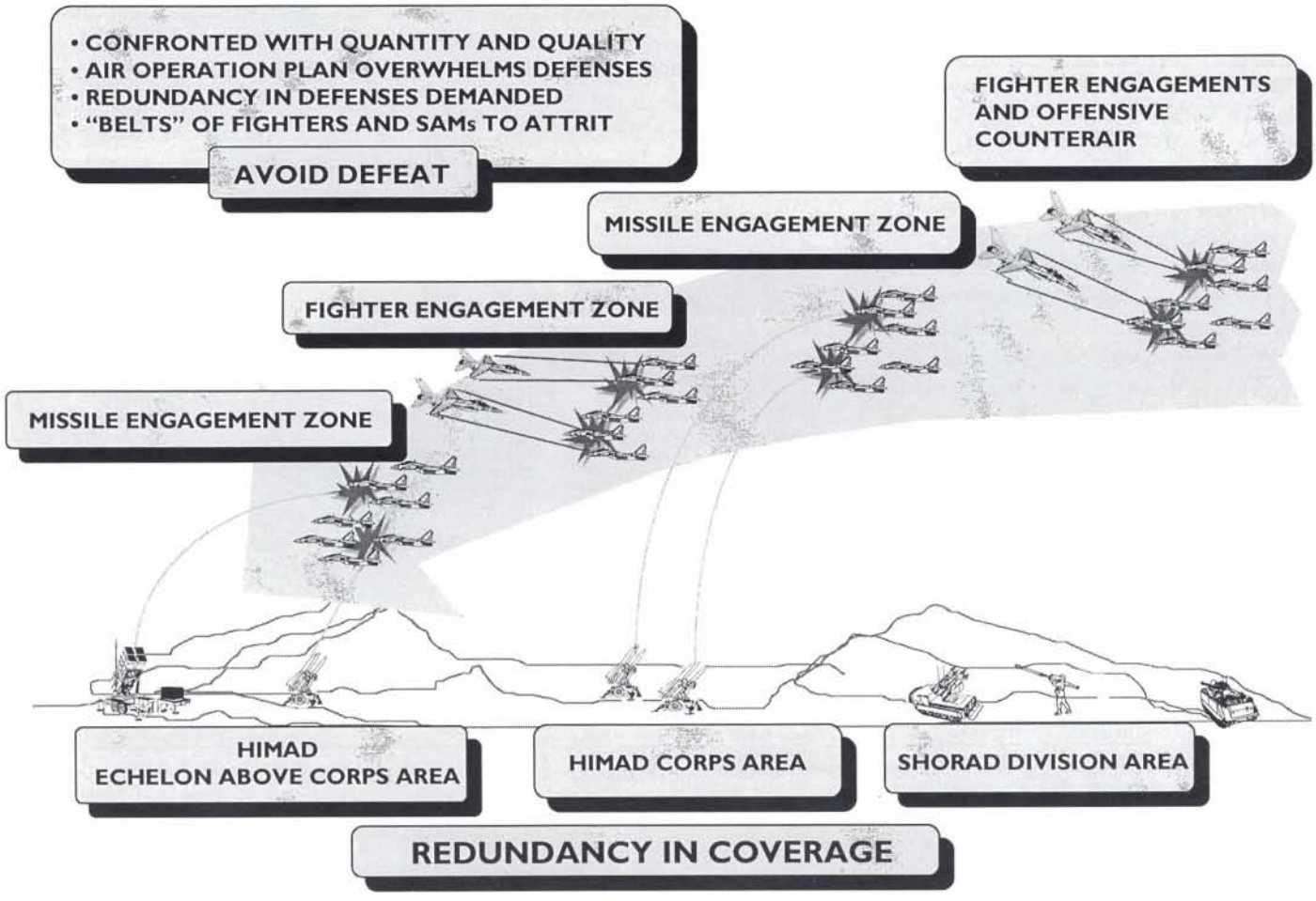
Many countries already have dedicated attack helicopters in their inventories. Some nations, such as Russia, have the technology to build dedicated attack helicopters similar in capabilities to the U.S. Apache, and may turn to exportation as a source of badly needed currency. Adding high-technology target-acquisition capabilities with standoff munitions to utility helicopter platforms is possible. Potential adversaries can acquire highly lethal armed- and attack-helicopter capabilities that, when combined with available night-vision capability, can inflict devastating losses on a maneuver force. The grave results of these possibilities dictate that the United States devise effective countermeasures.

UAVs substantially improve the warfighting capabilities of military forces. Over the past decade, improvements in command and control and navigation have made it possible to accurately place UAVs in high-intensity threat areas that once would have been impractical for penetration by manned systems because the casualty costs would have been too high. UAVs are proven combat multipliers. Of particular value to countries without access to satellite intelligence, UAV intelligence allows the threat commander to use a wide range of indirect fire systems (including conventional missiles) to attack potential targets throughout the breadth and depth of the battlefield. Blinding the threat commander by denying free UAV access to the battlefield will be key to reducing friendly casualties in the future.

ADA MISSION

Air Defense Artillery's mission is to employ ground-based air and missile defenses **to protect the force and designated geopolitical assets from aerial attack and surveillance** through all phases of contingency operations. Inherent in this mission is ensuring that the ground commander can dominate

COLD WAR CONCEPT



battlespace to achieve decisive victory by winning quickly with minimal casualties.

STRATEGY SUPPORT

We are no longer a forward-deployed Army. Stateside-based forces are the norm for the future. Our national military strategy reflects that change. The new national strategy — power projection — recognizes the stateside-based nature of our forces. Increasingly, U.S. military operations will support internationally sanctioned action against one or more nation states or non-nation state forces. The implication is that the armed services must continue to improve their capabilities to conduct joint and combined or coalition operations. When employed, military forces will seek quick, decisive victory.

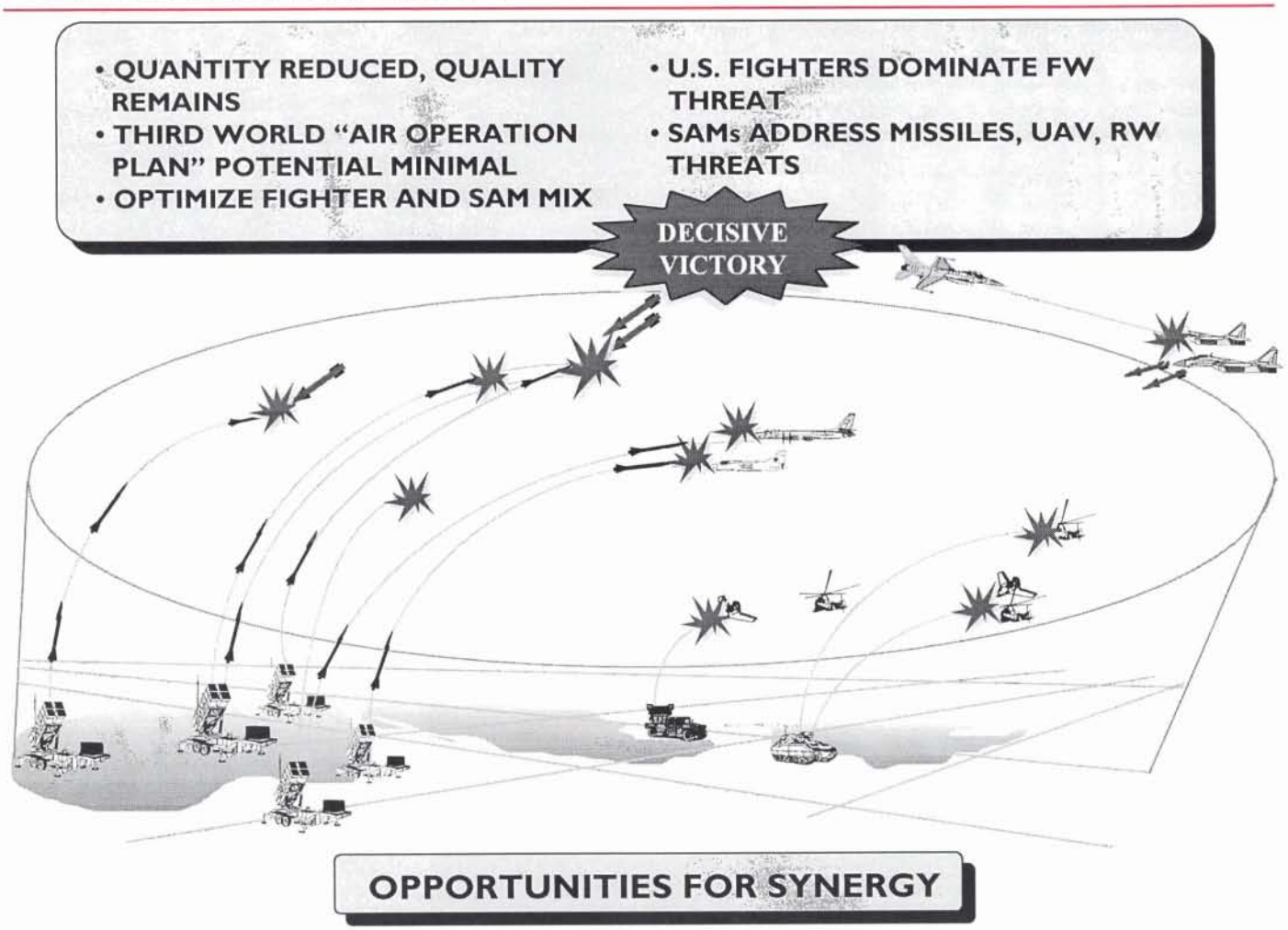
To achieve decisive victory, the Army must maintain the capability to place overwhelming combat power on the battlefield to defeat enemies quickly with minimum casualties. Successful air and missile defense operations are key to generating and sustaining combat power in contingency operations. Air Defense Artillery's challenge will be to provide protection of committed forces and assets throughout the theater or theaters of operation and in the continental United States. ADA tasks encompass the strategic, operational and tactical realms, literally from "mud to space." Future ADA capabilities must be synergistic with the air defense assets of the other armed services. The other armed services address the fixed-wing threat well and contribute to overall air and missile defense through attack or offensive counterair operations. Thus, Air Defense Artillery can focus on defeating ballistic missiles, cruise missiles, UAVs and rotary-wing platforms while retaining an inherent capability to defeat fixed-wing threats.

To successfully execute the above tasks, ADA units must be highly deployable, highly lethal against the expected threat, mobile and survivable on a level commensurate with that of the protected force, fully capable of integrating into applicable command, control, communications and intelligence (C^3I) architectures and platforms in the Army and sister services, and capable of battlefield sustainment over extended logistic lines.

ADA IMPERATIVES

To counter the spectrum of aerial threats, current initiatives are built on the realization that synergy must be the overall goal of the services' air and missile defense efforts. As such, air- and ground-based air defenses seek efficiency through avoidance of excessive redundancy. The nature of the threat helps to avoid such redundancy. The air threats confronting

POST-COLD WAR CONCEPT



Clockwise from left, an Avenger, a Theater High-Altitude Area Defense system prototype, a Bradley Stinger Fighting Vehicle with experimental Stinger pod, and a Patriot launcher.

the joint force today are divided into those best addressed by manned aircraft and those best countered by ground-based systems. The illustrations entitled the Cold War Concept and the Post-Cold War Concept on the preceding pages portray the shift from the Cold War approach to our current emphasis on leveraging the synergy of joint capabilities to the maximum extent possible. The Post-Cold War Concept illustration shows ground-based systems countering ballistic and cruise missiles, helicopters and UAVs, while fixed-wing systems counter fixed-wing threats.

The challenge for manned aircraft is twofold: physics and doctrine. Manned aircraft are inappropriate platforms to counter TBMs in the terminal phase due to detection difficulties and inadequate kill potential. When viewed from an aircraft,

cruise missiles, particularly those flying at a low level, are more difficult to detect and kill from above due to background clutter. UAVs and helicopter threats operate at altitudes and locations where air-to-air combat is doctrinally avoided. These threat platforms are more readily countered by ground-based systems.

Synergy in the joint and combined arenas results from sound doctrine, proper training and a common understanding of joint and combined force relationships and procedures. Today doctrinal, joint training and institutionalized relationships exist among the joint players to ensure unity of effort. This provides the multi-level linkage of land and air component operations and must be regularly rehearsed to ensure total force effectiveness.

OPERATIONS OTHER THAN WAR

Nations use all the resources at their disposal to pursue national objectives. America promotes the self-development of nations through the measured use of national resources and assistance. The Army's prime focus is warfighting, yet the Army's frequent role in operations other than war is critical. Use of Army forces in peacetime helps keep the day-to-day tensions between nations below the threshold of conflict. Typical peacetime operations include disaster relief, nation assistance, security and advisory assistance, counterdrug operations, arms control, treaty verification, support to domestic civil authorities and peacekeeping.

Hostile forces may seek to create a crisis or otherwise affect vital interests of others, including the United States, by creating a conflict. When diplomatic influence alone fails to resolve a conflict, persuasion may be required.

U.S. forces may be used to deter conflict. Their physical presence, coupled with their potential use, can serve as a deterrent and facilitate the achievement of strategic objectives.

When an air threat exists in operations other than war, Air Defense Artillery becomes an appealing political weapon of choice. By its very nature, Air Defense Artillery is defensive and, therefore, a non-escalatory entity. Yet deployed ADA forces are a clear demonstration of the United States' resolve in sensitive situations and contribute to the deterrence of aggression. Even when an air threat does not exist, ADA units or soldiers may find themselves involved in conflict resolution or peacekeeping endeavors.

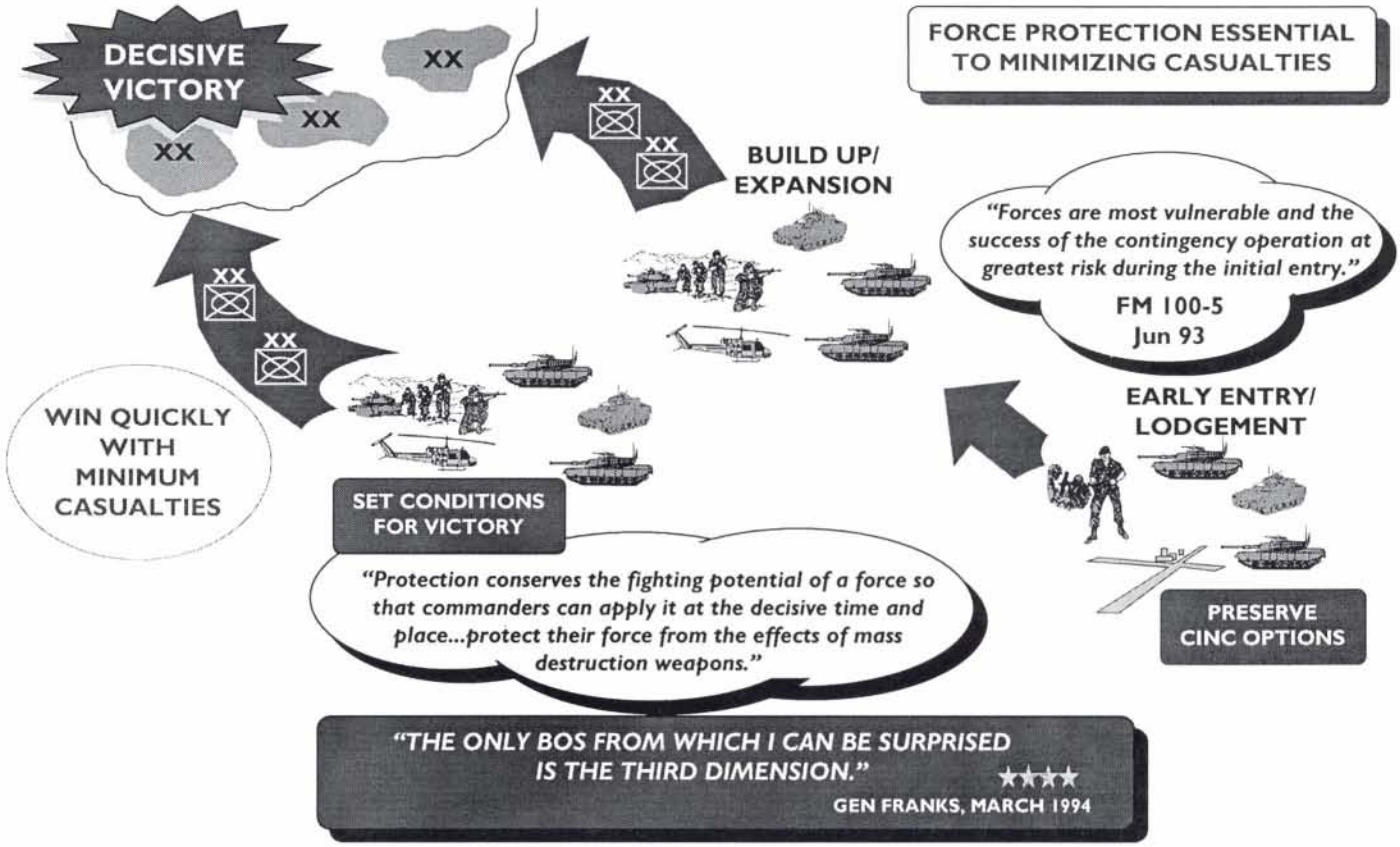
WARFIGHTING

Congress and the National Command Authority may decide to protect our national interests with force or the threat of force. War may be of a limited or general nature. Limited war is armed conflict short of general war as was conducted during Operation Just Cause in December 1989. General war, such as World War I and World War II, involves armed conflict among major powers in which the total resources of the belligerents are employed and national survival is at stake. In either instance, the Army, as part of a joint team, applies decisive force to fight and win with minimum casualties.

The Army will not operate alone. The Army contributes a full range of unique capabilities for combat, combat support and combat service support functions for sustained land combat operations as part of a joint, combined or interagency team.

Above, 3-62 ADA soldiers help restore democracy to Haiti. At left, 2-5 ADA soldiers don riot gear to provide security for volatile migrant camps at Guantanamo Bay, Cuba.

ARMY DOCTRINE - FM 100-5



This poses a dilemma for the adversary. As he attempts to avoid the efforts of one service, he becomes vulnerable to another. Also, the nature of conflict in regional crises may involve coalitions that differ from familiar, long-standing alliance structures. Cooperation with allies is the norm. This implies a need for interoperability, accommodation of allied objectives and capabilities, and some policy limitations.

In armed conflicts, ADA forces are required throughout the battlefield, theater of operations and theater of war, while simultaneously maintaining strategic protection of the United States.

Once force projection operations are initiated, ADA forces provide requisite force protection, in synergy with other joint and combined air defense elements, from entry through redeployment operations. Early deployment of missile and counter-RISTA (reconnaissance, intelligence, surveillance and target acquisition) units are crucial to the success of entry operations. Deploying forces and surrounding geopolitical areas are most vulnerable during the initial stages of the buildup. Tactical missile defense forces protect the lodgment, geopolitical assets and debarking forces against ballistic and cruise missiles. Counter-reconnaissance units deny the enemy targeting information that is key to the enemy sustaining an effective air or missile attack. Corps and divisional ADA units complement theater tactical missile defense forces by providing protection against short-range tactical missiles, fixed-wing aircraft and helicopters, and by limiting observation of UAVs. As the joint force expands the lodgment area, ADA units continue protecting the force and geopolitical assets, and deny enemy reconnaissance throughout the area of operations. Once decisive operations begin, ADA units focus on limiting or denying reconnaissance and targeting by UAVs and countering attacks by rotary-wing aircraft, thereby ensuring freedom of maneuver and minimizing casualties for the force. During post-conflict and redeployment operations, ADA forces concentrate on providing force security and preventing surprise attack, thus permitting unimpeded reconstitution and facilitating unopposed embarkation of forces that are no longer required.

Complementing the air and missile defense missions in theater are the strategic defense requirements of the United States. These requirements are that land-based weapons, sensors and command and control systems be fully integrated into a tiered architecture to provide air defense against ballistic missiles armed with mass casualty warheads.

DOCTRINE

Doctrine is the statement of how America's Army, as part of a joint team, intends to conduct war and operations other than war.

Doctrine touches all aspects of the Army. It permeates the Army's entire organizational structure and sets the direction for modernization and the standard

for leadership development and soldier training. Doctrine seeks to be sufficiently broad and forward-looking so that it rapidly accommodates major technological opportunities to give soldiers a battlefield advantage. It sets the conditions to exploit technologies that afford a significant increase in lethality, offers major improvement for protection of forces, exploits key vulnerabilities of potential adversaries and offers capabilities that simultaneously present an adversary with multiple threats.

However, today's global realities are in a period of significant change. Army forces may find themselves called upon to fight under conditions of rapid force projection that can build to major sustained operations in war and peace. These conditions can terminate quickly only to lead to other commitments elsewhere. Doctrine must be relevant to these conditions to be effective. It must be solid enough to weather the winds of turmoil and, at the same time, sufficiently dynamic to capture the relevant aspects of change.

Under the new doctrine referenced in FM 100-5 (June 1993), Army commanders at all echelons seek to dominate the enemy within their battlespace, producing decisive results with minimum loss of life. Using weapons systems with greater lethal reach than those of their adversaries, commanders will be able to mass effects, while maintaining a high operating tempo (OPTEMPO) with increasingly dispersed forces. This application of force will paralyze an enemy, denying him the opportunity to respond effectively, and lead to decisive victory.

ADA operations represent the Army contribution to counterair operations. The theater air commander is normally the area air defense commander. He or she integrates the capabilities of different services and establishes counterair rules of engagement and procedures for the theater.

Air defense operations are key when generating combat power. They provide the force with protection from enemy air attack, preventing the enemy from separating friendly forces while freeing the commander to fully synchronize maneuver and firepower. They also deny the enemy an ability to "see" the battlefield, which preserves operations security and permits unencumbered generation of combat power.

All members of the combined arms team perform air defense operations. However, ground-based ADA units execute the bulk of the force protection mission. These units (within a theater area of responsibility [AOR]) prevent enemy aircraft, missiles and UAVs from locating, striking and destroying deployed forces and critical assets.

Weapons of mass destruction and mass casualty and the proliferation of air and missile delivery means technology have greatly increased the threat to friendly forces and combat functions. The potential for catastrophic loss of soldiers, time or initiative, forcing a change to operational objectives, requires a greater role for theater air and missile defense when generating combat power at the operational level.

MATERIEL

The Army Modernization Vision — Land Force Dominance — directly supports the U.S. national military strategy. Five modernization objectives must be reached to realize the Army vision:

- Project and sustain the force.
- Protect the force.
- Win the information war.
- Conduct precision strikes.
- Dominate the maneuver battle.

These objectives emphasize overmatching any potential threat, thereby ensuring decisive victory with minimum casualties. The future battlefield will be characterized by fast-moving forces of unprecedented lethality. In a world of rapidly proliferating weapons technologies, particularly weapons capable of inflicting mass casualties, this overmatching philosophy becomes critical. Air Defense Artillery supports all five modernization objectives, but is critical to two of them and essential to ensuring decisive victory. An effective ADA capability protects the force from aerial attack and significantly assists in winning the information war by denying the enemy his airborne eyes.

In support of deploying or deployed forces, Patriot, Theater High-Altitude Area Defense (THAAD) and Corps Surface-to-Air Missile (SAM) systems will provide required protection against ballistic and cruise missiles armed with a variety of warheads. Inherent design capabilities allow the systems to address any fixed-wing aircraft that might enter an area of operations. Robust C^3 of task-organized missile defense enclaves will be integrated with state-of-the-art hardware and software to provide flexible firing doctrine, multiple shot opportunities, high defense effectiveness and missile defense support to attack operations and passive defense.

Patriot, the most talked about weapon of the Gulf War, was stretched to the limit in that conflict. ADA must continue to upgrade the capability of the world's only fielded and effective TBM killer to protect early entry forces, vital facilities and geopolitical assets from missile attack.

THAAD is well on its way to becoming reality. It will significantly extend the missile defense umbrella over deployed forces and counter a growing long-range exoatmospheric TBM threat. It will give Air Defense Artillery the capability to mount a sustained defense of geopolitical assets in future conflicts, much like Patriot's defense of Tel Aviv and Riyadh in the Gulf War. Patriot and THAAD will provide a two-tier defense of critical CINC assets. The multiple shot opportunities provided will enable development of near-leakproof coverage of defended assets.

ADA needs Corps SAM in the next decade to protect corps forces from short-range ballistic missiles, cruise missiles, UAVs and low-observable platforms. Corps SAM will be highly deployable by air and will provide CINC planners a more affordable option for obtaining air and missile defenses early in contingency operations. When combined with THAAD, two tier defenses will be obtained. Corps SAM will deny preferred attack options to the enemy, reduce the threat of mass casualties in the maneuver area, incorporate a high degree of mobility to support the type of rapid corps movements seen in Desert Storm, and augment the Patriot and THAAD enclave.

Constrained resources and the perception of a reduced air threat have delayed the full fielding of a forward area air defense capability to support maneuver forces. This delay poses a third-dimension threat to our maneuver forces today. To fill this gap in force protection, Air Defense Artillery

must refocus the forward area air defense program in the near and long term. The Bradley Stinger Fighting Vehicle (BSFV) offers the best near-term solution, but enhancements to it must be made as the threat grows in capability.

In the foreseeable future, BSFV, Stinger and Avenger systems will protect forces and assets against UAVs and helicopters. In the joint arena, Air Defense Artillery is the only proponent in theater that possesses the detection and killing mechanisms to address these targets. The systems will also engage fixed-wing aircraft and cruise missiles when required. FAAD C^3I leads the Army's efforts to "digitize the battlefield." The tactical digital information system, combined with the organic ground-based sensor (GBS) or light and special division interim sensor (LSDIS), provides responsive, near-real-time alerting and cueing to air defense weapons. The FAAD C^3I architecture also provides real-time third dimension situational awareness to maneuver commanders.

Lastly, the national missile defense system will evolve over the next decade to provide protection for the United States against accidental, unauthorized or limited launch of intercontinental ballistic missiles or submarine-launched ballistic missiles (ICBMs/SLBMs).

ORGANIZATIONS

Army tactical organizations and combat formations will be smaller, highly mobile, more lethal and have higher leader-to-led ratios. Army tactical formations will consist of a wider variety of tailorable combinations designed to meet the requirements of short notice contingency operations vs. fixed war plans. Flexible battle staffs will rapidly adapt to needed changes in task organization. In addition, Army units, their leaders and staffs will be accustomed to joint, combined and coalition operations, as well as those with civilian organizations and agencies.

The toughest organizational challenges for the ADA branch will be managing the changes in ADA force structure associated with restructuring the Army, coping with new weapon systems and preparing to assume new missions. The smaller, more versatile Army of the 21st century will be supported by an equally smaller, more versatile ADA force. This force will be based, predominantly, in the continental United States. ADA forces will be able to execute diverse missions, spanning the continuum of military operations, in support of commanders in chief worldwide. The ADA force (both active and reserve components) will be cohesive, trained and equipped to go to war with little or no notice. Units will be tailorable, with capabilities responsive to the expected threat, fully synchronized in attitude, aptitude and knowledge with the other members of the combined arms, joint operations and combined operations teams. They will be strategically deployable (in C-141, C-17 and C-5 aircraft with high firepower-to-lift ratios) and readily employable, emplacing in minimal time and extending air defense coverage over the joint forces.

All organizations in the ADA force, from squad level to echelon above corps units, must be flexibly structured to ensure they are versatile enough to execute our new doctrine.

TRAINING AND LEADER DEVELOPMENT

Command of full dimensional operations will place extraordinary demands on future Army leaders. Not only will they face the traditional challenges of combat command, but unprecedented new challenges as well.

Future commanders must be agile-minded, innovative, disciplined leaders who are able to visualize the battlefield. They must be tactically proficient warfighters who can outthink and outfight any adversary. They must master the fundamentals of their profession and be able to apply them successfully — under complex rules of engagement — in a wide variety of political, social and environmental conditions in operations that range from large-scale land campaigns to non-combat operations other than war. In addition, they must be sensitive to the complexities of the mission they are likely to be given and be able to use highly sophisticated decision-making aids.

Training and leader development programs will be vital to the professional development of these commanders. Changes in school curricula, challenging exercises, unpredictable scenarios at the combat training centers, and the use of virtual and constructive simulations with live exercises will train commanders and leaders to manage uncertainty in future operations. These efforts will produce intuitive leaders who are tactically proficient and flexible in their thinking.

Training and leader development programs, both in the Air Defense Artillery School and in ADA tactical units, must change with time. These programs must continue to emphasize the role of the ADA soldier as an integral member of the joint and combined arms team. The increased use of training aids and simulators and simulations will facilitate such emphasis, add realism and reduce OPTEMPO costs. Continued use of distributed training means (exportable training packages, graphic training aids and correspondence programs) will permit standardized training at diverse locations, while reducing the challenge and cost of sending soldiers to school. This is particularly important as Air Defense Artillery grows in the reserve component. Reserve component soldiers and leaders must receive training that is adaptable to their schedules as citizen-soldiers, as well as sufficiently challenging to meet the needs of a deployable force.

SOLDIER CARE AND GROWTH

Sophisticated weapons require quality soldiers. Despite the Army drawdown, dwindling demographics will make recruiting quality enlisted soldiers and attracting newly commissioned officers to Air Defense Artillery a continual challenge. To successfully compete with other combat arms in the military manpower market, the branch must place new emphasis on informational and promotional products that enhance the ADA image. Distributed to ROTC campuses, active and reserve component ADA units, throughout the Army and to our sister services and the Department of Defense and Congress, these products will serve dual purposes. By enhancing the branch's image, they will attract quality recruits and accessions; by creating a keen combined arms and joint service understanding and appreciation of Air Defense Artillery's

roles and missions, they will secure the branch's future.

Recruiting quality enlisted soldiers and assessing quality lieutenants who possess the potential to become tomorrow's leaders will profit Air Defense Artillery little unless the branch succeeds in retaining them. The key to retention will remain building branch pride; maintaining officer and noncommissioned officer professional development standards at, or above, their current levels; and providing promotion opportunities through continued assessment of MOS career paths. Operation Desert Storm proved to America that ADA soldiers are a vital part of our Army. This is a reputation the branch must maintain and nourish.

Training is the most essential ingredient of soldier care; it is training that enables soldiers to fight, win and survive on the battlefield. No branch does a better job of preparing its soldiers and leaders for combat and for the future than Air Defense Artillery. Training designed to challenge and develop individual soldiers, leaders and units proficient in battlefield skills will remain the "First to Fire" branch's top peacetime priority. The branch will continue to support and emphasize Army training concepts by executing the Army's doctrine for "training the force" with realistic, multi-echelon, combined arms and joint training in the classroom, in the unit, and during field training exercises at combined training centers and battle command training programs.

FISCAL REALITIES

The diminished defense budget has dictated a smaller force structure that relies on high quality, technologically advanced forces organized to effectively address regional threats. To maintain these forces, the Army leadership seeks reasonable savings in operations and training through effective use of simulations from squad to theater levels.

While the Army copes with force structure and weapon systems program reductions, Air Defense Artillery is assisted by a strong national commitment to deploy enhanced active theater missile defense systems. While national missile defense currently ranks behind theater missile defense in priority, strong arguments are ensuing to develop a national missile defense capability to protect against future missile threats to our homeland.

Although the ADA force and budget have decreased since Desert Storm, our mission to provide *force protection* is vital to the warfighting ability of our Army and solidifies our existence as a key member of the combined arms team.

THE BOTTOM LINE

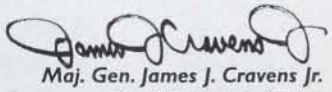
While the post-Cold War era has been characterized by decreasing budgets, downsized force structure and a perceived lessening of the threat, the role of Air Defense Artillery in support of the national military strategy remains strong. ADA missions continue to encompass support of committed or employed forces from the strategic to tactical levels of the battlefield. The ADA plan for the future recognizes the diversity of mission needs and identifies the means to satisfy the doctrine, organization, materiel, training and leader development, and soldier care requirements. The following ADA imperatives must be satisfied to maintain relevance in the 21st century:

- Access and retain quality soldiers.
- Train ADA leaders in the New warfighting imperatives.
- Maintain trained and ready fighting units.
- Provide force protection to the joint force and designated geopolitical assets.
- Publish and execute new ADA doctrine.
- Restructure the ADA force to be more responsive and tailorable for contingency operations (Force XXI).
- Upgrade and procure weapon systems that respond to the changing air threat of the 21st century.

Because of the efforts of quality leaders and soldiers in our branch today, and those that will surely follow, Air Defense Artillery will meet the challenges of the 21st century and contribute greatly to the Army's goal of land force dominance — a goal underscored by decisive victory with minimum casualties.

Air Defense Artillery was trained and ready yesterday, and it will be trained and ready tomorrow!

MORE THAN EVER BEFORE, AIR DEFENSE ARTILLERY IS A VITAL PART OF THE ARMY'S COMBINED ARMS AND JOINT FORCE TEAMS. BOTH A TACTICAL AND STRATEGIC FORCE THAT CONTRIBUTES TO DECISIVE VICTORY, AIR DEFENSE ARTILLERY HAS CROSSED THE THRESHOLD OF THE POST-COLD WAR WORLD FIRMLY CONFIDENT OF SUCCESSFULLY EXECUTING ITS FORCE PROTECTION AND COUNTER-SURVEILLANCE ROLES — ARMED WITH A VIEW OF ITS EXPANDING ROLE IN THE FUTURE. THIS PAPER OUTLINES THE VISION OF AIR DEFENSE ARTILLERY IN THE 21ST CENTURY. IT EXPLAINS THE ADA REQUIREMENTS OF SUPPORTING THE ARMY TO GAIN LAND FORCE DOMINANCE. THE CHALLENGES OF THE FUTURE ARE GREAT, BUT WHEN CALLED, THE SOLDIERS OF AIR DEFENSE ARTILLERY WILL BE PREPARED TO BE . . . *FIRST TO FIRE!*



Maj. Gen. James J. Cravens Jr.
Chief, Air Defense Artillery

FORT BLISS

CENTER OF EXCELLENCE

BY CAPT. THOMAS W. COLLINS

Air Defense Artillery's expanding role has placed Fort Bliss, Texas, at the forefront of an Army that is trained, deployable and ready to meet tomorrow's challenges. This all-terrain, multimission installation with its variety of capabilities has a bright future, and is firmly embedded in the U.S. Army Training and Doctrine Command's (TRADOC) vision of conducting a training and leader development program characterized by centers of excellence.

As TRADOC Commanding General Gen. William Hartzog recently wrote, a center of excellence is not limited to a geographical location; rather, it's "where institutional training is conducted and from which training is distributed to individuals and units at distant locations; a system in which the separation between the three pillars of professional development — institutional training, operational assignments and self-development — are diminished by increased information connectivity. It's a system based on the focus and rigor of commonly understood tasks, conditions and standards and a prevalent and enduring belief that meeting and sustaining training standards is TRADOC's most important goal."

The ADA School serves as the single-source knowledge base for all Army ADA forces

As a center of excellence, Fort Bliss plays a critical role in making this TRADOC vision a reality. The Air Defense Artillery School is the bedrock of ADA institutional training and supports the branch worldwide. Through development of training, doctrine, materiel requirements and organization, the ADA School serves as the single-source knowledge base for all Army ADA forces. As the hub of ADA intellectual development, the school provides tactically and technically competent leaders, soldiers, combat organizations and weapons systems that are doctrinally based, organizationally sound and technologically superior.

The ADA School, through its cooperative training with allied forces, brings an added dimension to the ADA Center of Excellence.

The permanently stationed German Air Force Air Defense School, along with the many other allied nations that train their soldiers at Fort Bliss, creates an environment of cross-pollination and a uniqueness shared by no other installation.

The ADA Center of Excellence is not solely focused on air defense training of U.S. and allied soldiers, it's also committed to training soldiers and NCOs through various Fort Bliss schools to meet the skill requirements of the Force XXI Army. From the Primary Leadership Development Course, Basic and Advanced NCO Courses to the Army's most senior courses at the U.S. Army Sergeants Major Academy, Fort Bliss is committed to the professional development of its greatest asset — soldiers.

The restructuring of the force to meet the requirements of the Force XXI Army has directly affected these soldiers. The 3rd Armored Cavalry Regiment will end 24 years here when it relocates to Fort Carson, Colo., in 1996. In its place will come three Forces Command ADA brigades: the 108th ADA Brigade from Fort Polk, La.; the 31st ADA Brigade from Fort Hood, Texas; and the 35th ADA Brigade from Fort Lewis, Wash.

These moves will add strength and depth to the ADA Center of Excellence. By consolidating all of the Army's CONUS based ADA brigades at Fort Bliss, the Army will be able to make better use of declining resources, consolidate training and, if necessary, deploy these units for war.

Together with the 11th ADA Brigade already stationed here, these new ADA brigades will form the power projection Army's response to air and missile threats. Recent examples of our ability to rapidly deploy Fort Bliss-based Patriot battalions have occurred in South Korea and Southwest Asia. These crucial ADA units have become "weapons of diplomacy," giving the National Command Authority added flexibility in responding to world trouble spots with a robust non-threatening deterrent to aggression.

Only Fort Bliss can accommodate every weapon system in the Army today

Essential to accomplishing missions of this nature is the requirement for adequate training and deployment facilities. No other installation in the Army can match the ADA Center of Excellence for its exceptional combination of training areas, ranges and air and rail deployment facilities.

Fort Bliss encompasses 1,749 square miles of training area. An area larger than the state

The Armed Forces YMCA offers first-class accommodations. (Photo by Spec. Matt Tinkham)

The new Centennial NCO club and banquet facility offers the best service and accommodations in the area. (Photo by SFC Richard Glynn)

aries of Fort Bliss. When combined with White Sands Missile Range to our north and adjacent to Fort Bliss, this area is larger than the state of Connecticut. Fort Bliss is the only installation that can accommodate every weapon system in the Army today.

A key component of the ADA Center of Excellence is its ability to develop new technology and battle doctrine. Fort Bliss, as the home of ADA's Directorate of Combat Developments, is at the forefront of ADA progress. The Theater Missile Defense Advanced Warfighting Experiment, conducted April 28 to May 8 during Exercise Roving Sands, illustrated the critical role Air Defense Artillery plays in our nation's warfighting capability. Now, more than ever, Fort Bliss is developing new concepts and systems for the future by maximizing use of these advanced warfighting experiments, simulations via the Synthetic Theater of War, and cooperative training with allied forces.

As technology and weapons sophistication increases, so does the need for units to train in a realistic, joint environment that replicates the threats U.S. forces will face in the 21st century. Roving Sands, the U.S. Atlantic Command-sponsored, U.S. Forces Command-executed joint air defense exercise, is such an environment. Conducted annually at Fort Bliss, this year's exercise was the biggest ever, showcasing the ADA Center of Excellence's ability to accommodate almost 24,000 soldiers, sailors, airmen and marines. This exercise also marked the first time German and Dutch ADA soldiers participated in a training exercise on American soil.

Exercise Roving Sands and other exercises demonstrate the trend toward joint operations and quick deployment of U.S. forces. Fort Bliss offers the essential ingredients: unsurpassed firing ranges and training areas that can accommodate thousands of soldiers, and the facilities that allow them to quickly get to the fight.

Aside from our recent designation as a center of excellence, Fort Bliss has received an interim designation as a power projection

Fort Bliss' open expanses are unmatched by any other TRADOC installation (Photo by Spec. Matt Tinkham)

Aside from our recent designation as a center of excellence, Fort Bliss has received an interim designation as a power projection platform by the Department of Defense. The post is in the Department of Defense's five-year funding plan to receive the funds necessary to upgrade our facilities.

One of the ADA Center of Excellence's most outstanding deployment and mobilization features is Biggs Army Airfield. The Army's largest airfield, it has the third longest runway in the United States at 13,600 feet and can accommodate the military's largest troop and equipment aircraft. The airfield has six miles of taxiways and eight million square feet of ramp space. By comparison, Biggs Army Airfield is 40 percent larger than the Los Angeles International Airport!

Fort Bliss is currently under consideration for a Department of Defense-Department of Transportation initiative known as the Intermodal Installation Program. The IIP envisions a military and civilian industrial use, state-of-the-art, transportation complex. The excellent facilities at Biggs Army Airfield, coupled with those of the adjacent El Paso International Airport, make the ADA Center of Excellence the ideal mobilization center for the western United States.

Along with its world-class deployment facilities, the ADA Center of Excellence is at the forefront of the Force XXI Army. The Air Defense Lab here acts as the Air Defense Artillery lead for concept evaluations, capability requirements, analysis and a host of other issues that will lead Air Defense Artillery into the 21st century. In concert with the Field Artillery School at Fort Sill, Okla., the Air Defense Lab addresses full-dimensional issues related to depth and simultaneous attack.

Aiding this effort is the Fort Bliss warfighting center. A state-of-the-art simulation facility complex, the center supports advanced warfighting experiments, advanced concept technical demonstrations, cost and operational effectiveness analyses and joint-sponsored war games. Recently designated a Defense Simulation Internet Node, the Fort Bliss warfighting center allows air defenders to hone their skills on the electronic battlefield through interactive, constructive and virtual simulations.

The ADA Center of Excellence is not only concerned with training. Branch leaders recognize that morale is a key ingredient to combat readiness, and have made great strides toward improving the quality of life for soldiers, family members and civilian employees. Among Fort Bliss' many quality of life initiatives are newly-built youth centers, the newly renovated Kelly Park, the recently expanded commissary (now the largest in the Department of Defense), a 52-lane bowling alley, a new centennial club and banquet facility, and a host of other new or upgraded facilities. These facilities are indicative of the great effort to make the ADA Center of Excellence an even better place to live and work.

Much is also being done to improve the quality of life for single soldiers. By 2001, a barracks modernization program currently underway will renovate more than 5,000 barracks spaces to reflect the Army standard for soldier care. Coupled with the Better Opportunities for Single Soldiers program, and several recreational facilities geared toward their interests, the ADA Center of Excellence offers single soldiers great opportunities.

Unlimited maneuver training, power projection platforms, mobilization training exercises and vast amounts of airspace combine with our quality of life initiatives to give Fort Bliss the decisive edge in training and soldier care. With the consolidation of all the Army's ADA brigades here, the institutional knowledge and resources of the ADA School and the successful matching of Force XXI technology with the essential requirements of live field training, Fort Bliss has achieved the TRADOC vision for the ADA Center of Excellence.

Biggs Army Airfield, the Army's largest, has the third longest runway in the United States, six miles of taxiways and eight million square feet of ramp space

***Capt. Thomas W. Collins** is a public affairs specialist with the Fort Bliss Public Affairs Office.*

Shorts aircraft and missiles. Multi-mission, single source.

The answer to today's increasing demand for higher quality, lower cost defense.

Shorts aircraft and missile systems offer such reliability and cost-effectiveness, you might think we saw the world's politics changing, and defense budgets shrinking.

Actually, what we saw was a need for aircraft and missiles that could handle a variety of missions and offered outstanding operating economics — backed by the best in contractor logistical support.

Here's what we offer:

SHORTS STARSTREAK — Whether on Apache or Avenger, vehicular-mounted or shoulder-launched, Starstreak has no challengers as a fast, accurate, lethal weapon system.

SHORTS C-23 SHERPA — The ideal multi-purpose light military transport. Entered USAF inventory in 1985 at Zweibrucken, West Germany. Recently procured by the Army National Guard and now moving into a third generation.

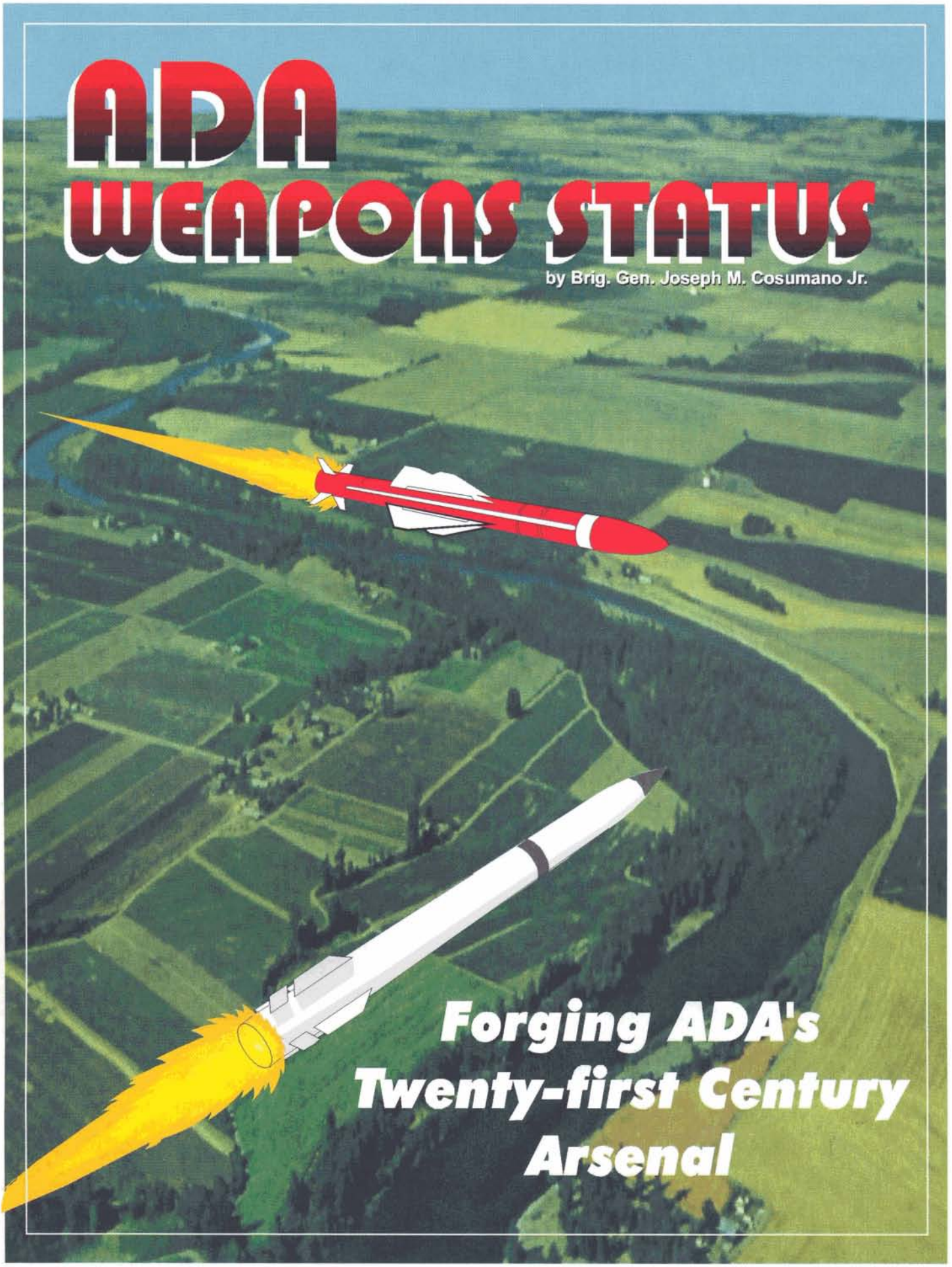
SHORTS TUCANO — The advanced turboprop trainer that combines outstanding aerobatic capabilities, stepped tandem seating and a jet-like "feel" with unmatched life-cycle economics. It is the equivalent of the RAF Primary Aircraft Trainer Systems.

For more information about our aircraft, missiles, and support programs, contact Short Brothers (USA), Inc., 2011 Crystal Drive, Suite 713, Arlington, VA 22202-3719. Or call us at (703) 769-8700.

BOMBARDIER **SHORTS**

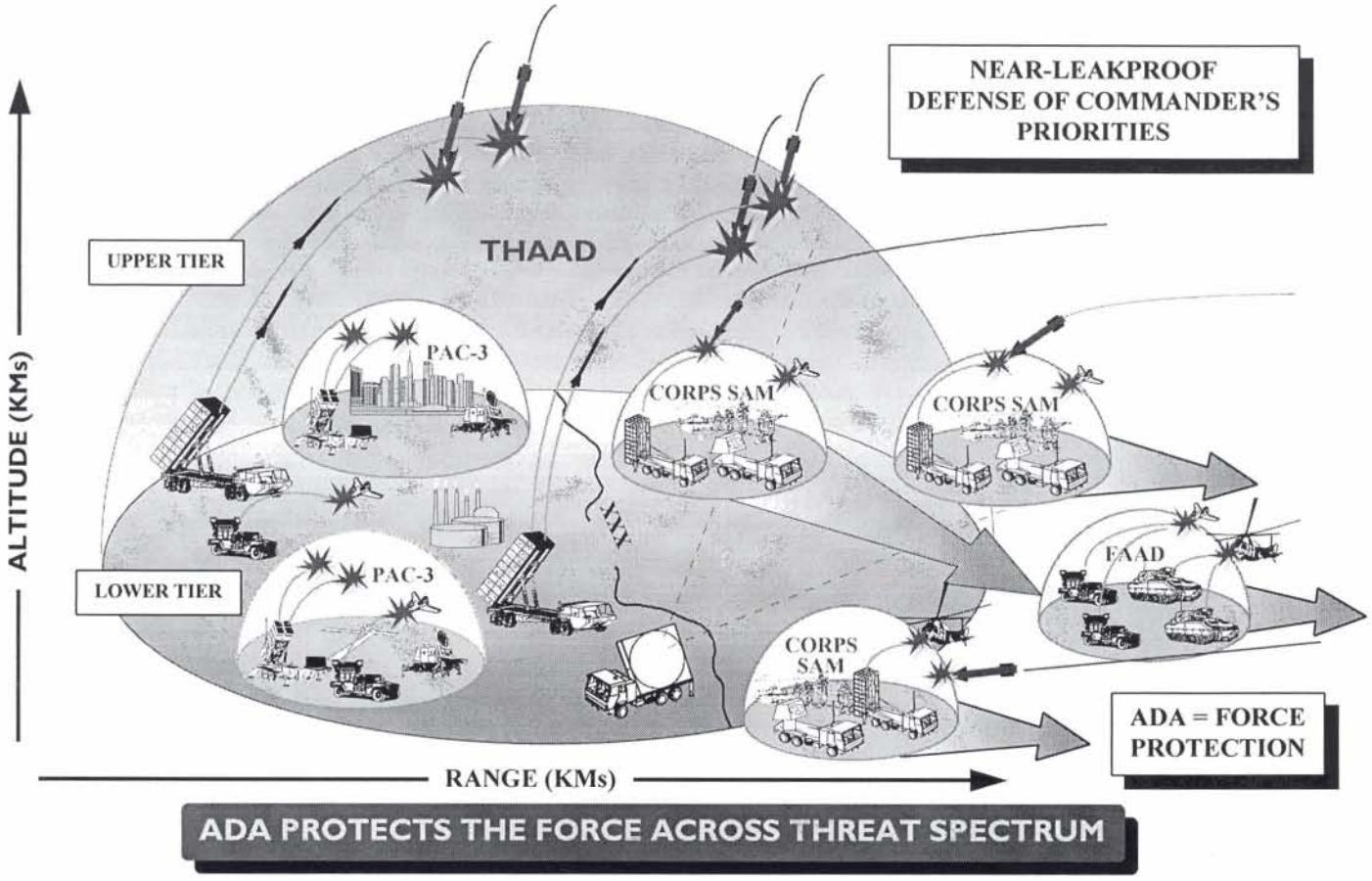
ADA WEAPONS STATUS

by Brig. Gen. Joseph M. Cosumano Jr.



Forging ADA's Twenty-first Century Arsenal

SYSTEM OF SYSTEMS CAPABILITIES



With the worst of the post-Cold War force reductions and budget cuts behind them, senior leaders agree that the Army has weathered the storm amazingly well, but many view the future — the dreaded "outyears" — with alarm. Their chief causes for concern are rapidly aging weapon systems coupled with the curtailment or outright elimination of modernization programs designed to bring future weapon systems on line.

The Force XXI vision of a "digitized battlefield" is spreading Information Age technologies across every battlefield operating system, but for the most part, the weapon platforms of Operation Desert Storm are already middle-aged and growing older. The problem plagues every combat arm except one. Instead of coping with aging systems, the "First to Fire" branch, spurred on in some instances by congressional mandate, is meeting the challenge of rapidly fielding entirely new weapon systems while rapidly upgrading existing systems.

Today, Air Defense Artillery divides its arsenal of weapon systems into two categories: theater missile defense (TMD) systems and forward area air defense (FAAD) systems. Working in synergy, these highly lethal air defense systems will protect Force XXI against the full spectrum of the air threat across entire theaters of operations.

ARMY STRATEGY FOR ACTIVE TMD SYSTEMS

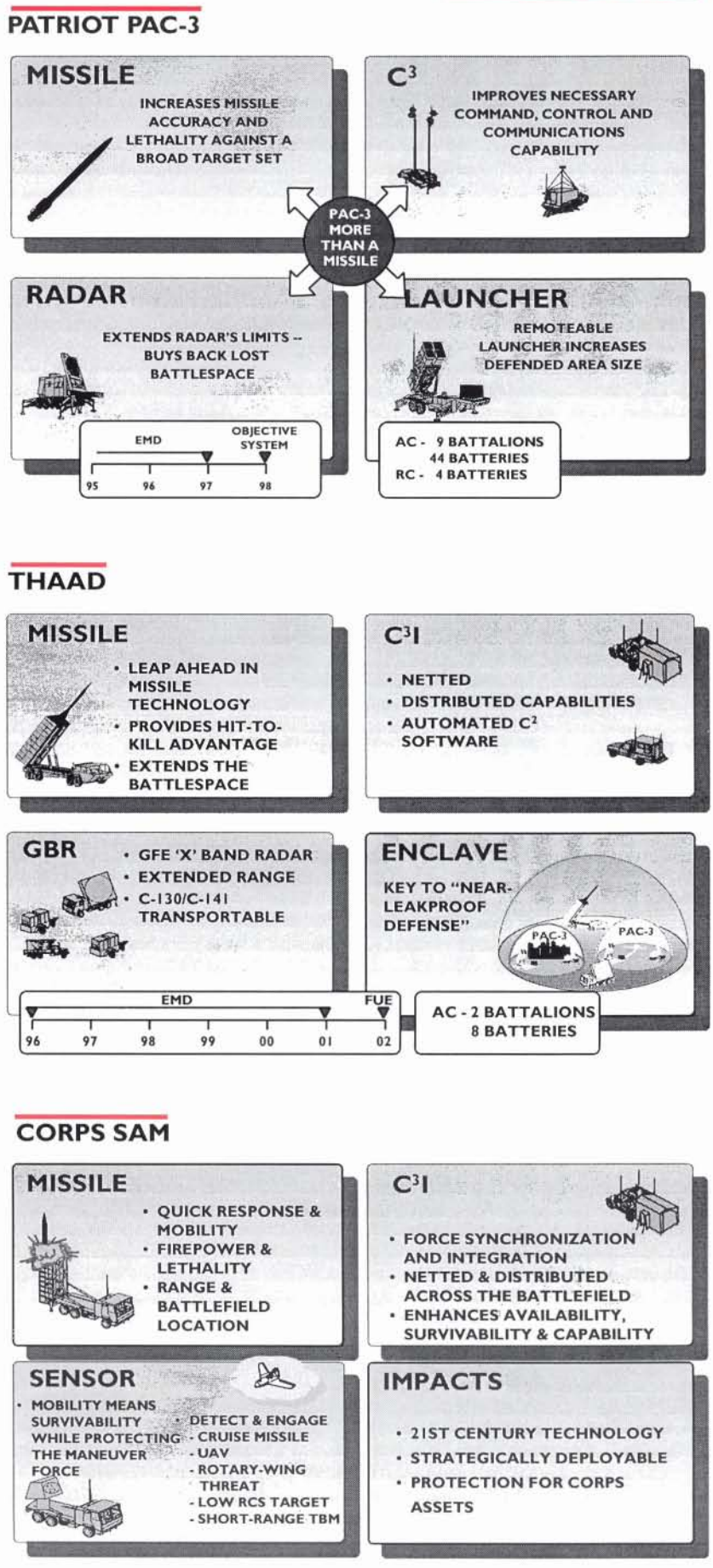
Theater Missile Defense

Today, even third-rate powers are developing the means to deliver weapons of mass destruction. More than 20 countries already have tactical ballistic missiles (TBMs). Cruise missile technology is cheap and proliferating. In response, Air Defense Artillery is rapidly fielding a near-leakproof TBM shield.

Gulf War commentators correctly described the first Patriot intercept of Iraqi Scuds as a "major event in the history of warfare," but Patriot was originally designed to counter fixed-wing aircraft, not TBMs. Today, the Army is rushing Patriot Advanced Capabilities-3 (PAC-3) enhancements to the field in a series of configurations that will dramatically upgrade the system's capability against TBMs and air-breathing threats. The upgrades include radar enhancements, system hardware and software modifications and the Extended Range Interceptor, or PAC-3, missile, which will permit Patriot to intercept TBMs at greater ranges and higher altitudes.

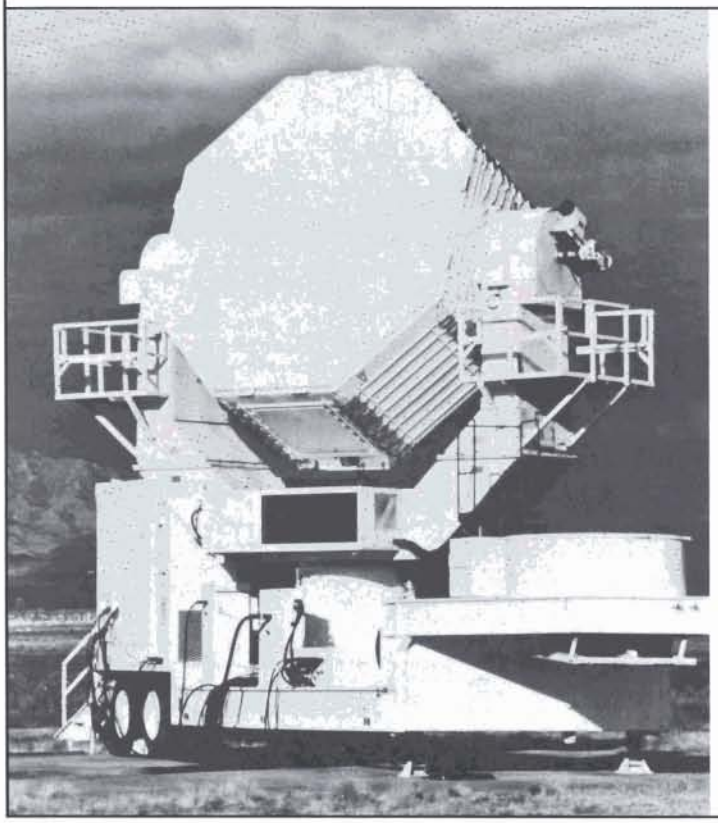
For the moment, Patriot stands alone as the world's only TMD system, but not for long. Operational testing and evaluation of the new Theater High-Altitude Area Defense (THAAD) system, the first system specifically designed to intercept TBMs, begins this summer. As the long-awaited "silver bullet" of TMD systems, THAAD will intercept incoming TBMs at the periphery of the earth's atmosphere, protecting debarkation areas, critical assets and population centers from hazardous missile debris. A kill-assessment capability will determine if the warhead is destroyed or if a second missile needs to be launched. As the upper tier of a layered defense, THAAD will satisfy congressional mandates for the development of a near-leakproof TBM defense this decade.

The Corps Surface-to-Air (SAM) missile is a 21st century system that will be fielded as the Army completes its transition to Force XXI. Corps SAM will fill a critical need by protecting maneuver forces and critical assets and by providing 360-degree coverage against short-range ballistic missiles, cruise missiles, unmanned aerial vehicles and low observable platforms. Conceived with contingency operations in mind, Corps SAM will be highly deployable by air and more mobile than existing TBM systems.



Instrumentation Heritage – Proven Performance On The Ranges.

AN/MPS-39 Multiple Object Tracking Radar (MOTR)



System Description

- Simultaneous transponder/skin track on up to 40 objects, and scans 2 sectors
- Inter-active displays and controls with dual operator positions
- Automatic calibration, built-in test system and equipment
- Transportable, 24 hour set-up time
- Phased array on a precision elevation over azimuth pedestal provides full hemispheric coverage
- Frequency – 5.4 to 5.9 GHz tunable, coherent
- Tracking accuracies at 20 dB or greater, single hit signal-to-noise ratio:

	Absolute	Relative
• Angles:	0.2 mils rms	0.15 mils rms
• Range:	2 yard rms	0.8 yard rms

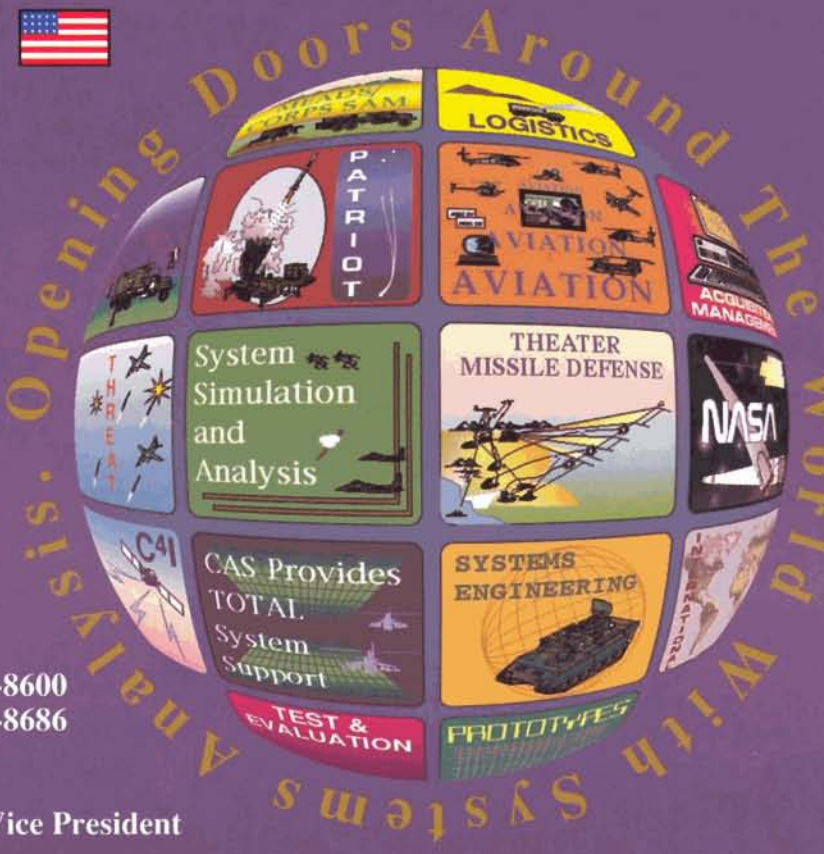
- MTBF: 90 hours (specified); ~ 160 hours (field experience)
- MTTR: 1.26 hours (maximum 2.69 hours)
- Maximum unambiguous range – 8,192 kyd (Nth time tracking on all targets)
- MTI selectable for any or all track files

LOCKHEED MARTIN

Lockheed Martin
Government Electronic Systems
199 Borton Landing Road, Moorestown, NJ 08057

For further information contact:
John Bornholdt (609) 722-3027

CAS inc.
WEAPON SYSTEMS ANALYSIS



CAS, Inc.
650 Discovery Drive
P. O. Box 11190
Huntsville, AL 35814

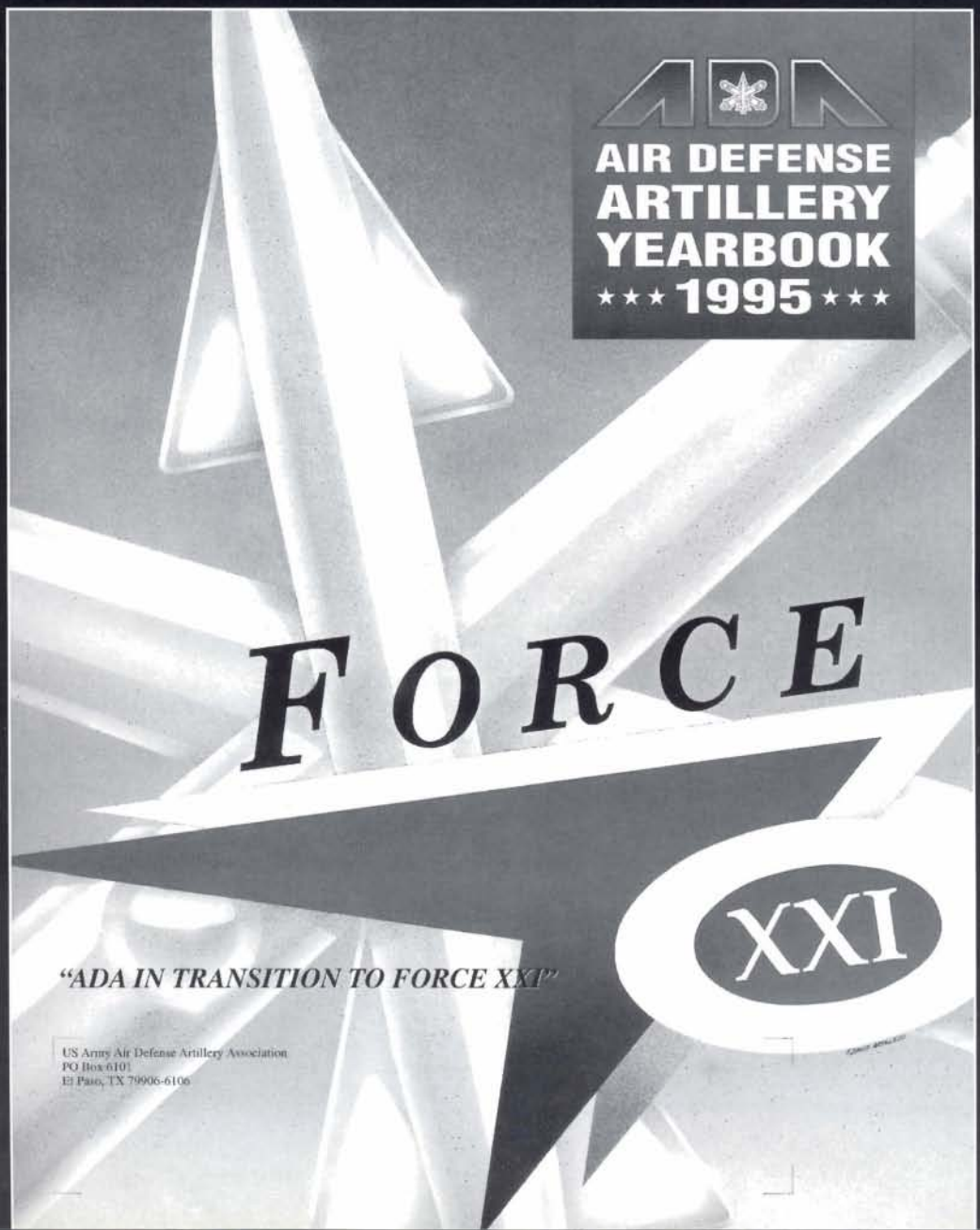
Telephone: (205) 895-8600
Toll Free: (800) 729-8686

Contact:
Charles G. Vaughn, Vice President

VOICE OF THE AIR DEFENSE ARTILLERY

The ADA Yearbook is the authentic voice of the Air Defense Artillery, the Army's most dynamic combat arm. Filled with authoritative articles by the highest ranking ADA officers, including the Chief of Air Defense Artillery, it serves as the "First to Fire" branch's annual "Corporate Report." For the remainder of the 20th Century, the ADA Yearbook will set the azimuth for Air Defense Artillery's transition to Force XXI, the Army of the 21st Century.

The ADA Yearbook also tells the story of those contractors which support the Air Defense Artillery. It provides comprehensive coverage of the contractor's weapon systems and presents convincing arguments for maintaining a strong air defense structure. It offers contractors the ***only*** opportunity to advertise in a publication written by, designed for and delivered directly to ADA leaders and decision makers worldwide.



Make plans NOW to be included in the ADA Yearbook 1996.

Air Defense Artillery is one of the defense contractors largest customers. It is the only combat arm that will develop, procure and field major new weapon systems in this century!

Targeted for specific audiences, the ADA Yearbook reaches key procurement and acquisition decision makers in Congress, the Pentagon and major military commands inside and outside the continental United States.

Distributed free to military representatives of U.S. allied and friendly countries, the ADA Yearbook reaches both foreign and domestic military markets.

As a lobbying tool, the ADA Yearbook supports ADA force structure initiatives and weapons procurement programs in which your company has a stake.

Advertising in the ADA Yearbook is a show of support for Air Defense Artillery.

Don't miss the opportunity to tell your company's story.

Call 915-542-0103 for advertising information.

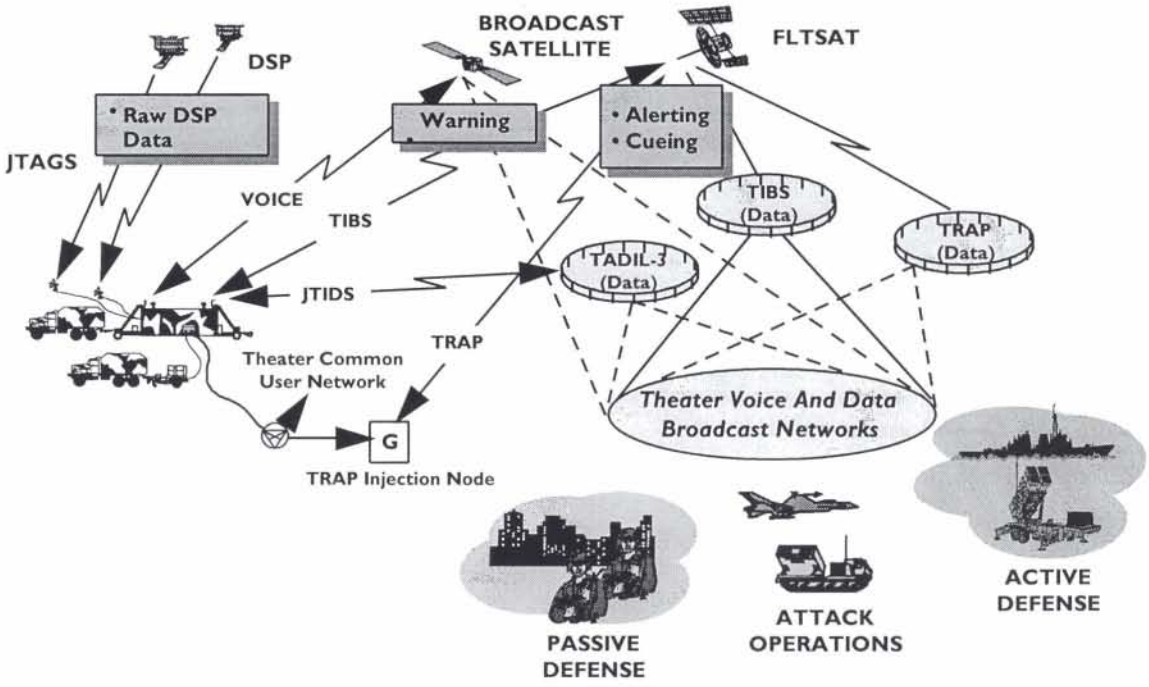
Advertising Ink,
publisher of the ADA Yearbook
114 South Oregon Street
El Paso, Tx 79901-2320

Only ADA weapons protect the force across the entire threat spectrum

Air Defense Artillery's TMD systems, as well as its FAAD systems, will share fully in the Armywide renaissance of Information Age technologies. Joint tactical ground stations (JTAGS) and automated brigade and battalion air defense tactical operations centers (ADTOCs) linked to organic and external sensors, including satellites, will dissipate the "fog of battle" and multiply the "First to Fire" branch's combat effectiveness by orders of magnitude.

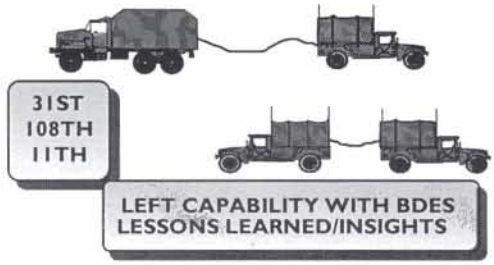
Although Patriot PAC-3 enhancements are only partially fielded and THAAD and Corps SAM are yet to be fielded, these ADA systems are already active players on the simulated battlefield. Senior ADA leaders are confident that threat trends and the Force XXI series of advanced warfighting experiments will strengthen Air Defense Artillery's TMD force structure and expand its role on the 21st century battlefield.

JTAGS SUPPORT TO THE THEATER



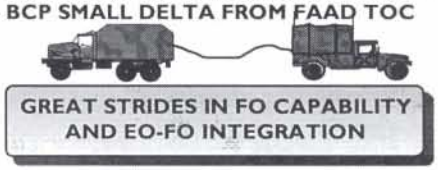
ADTOC STATUS

BRIGADE PROTOTYPE RS '94

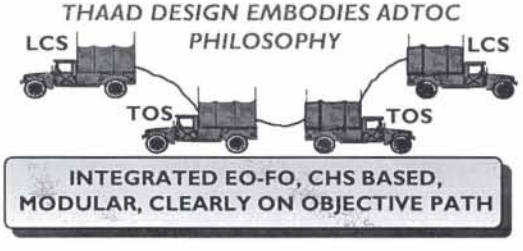


BTOC ENHANCEMENTS/BCP DEVELOPMENT

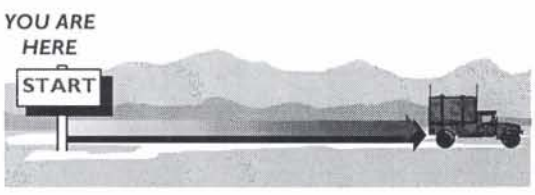
- BTOC
  - TRANSITION TO CHS HP 735 AND ADA
  - TYPE CLASSIFY
  - RETROFIT BEGINS FY96
- USE OF FAAD C³I DEVELOPED FO IN BTOC AND BCP
  - BCP SMALL DELTA FROM FAAD TOC



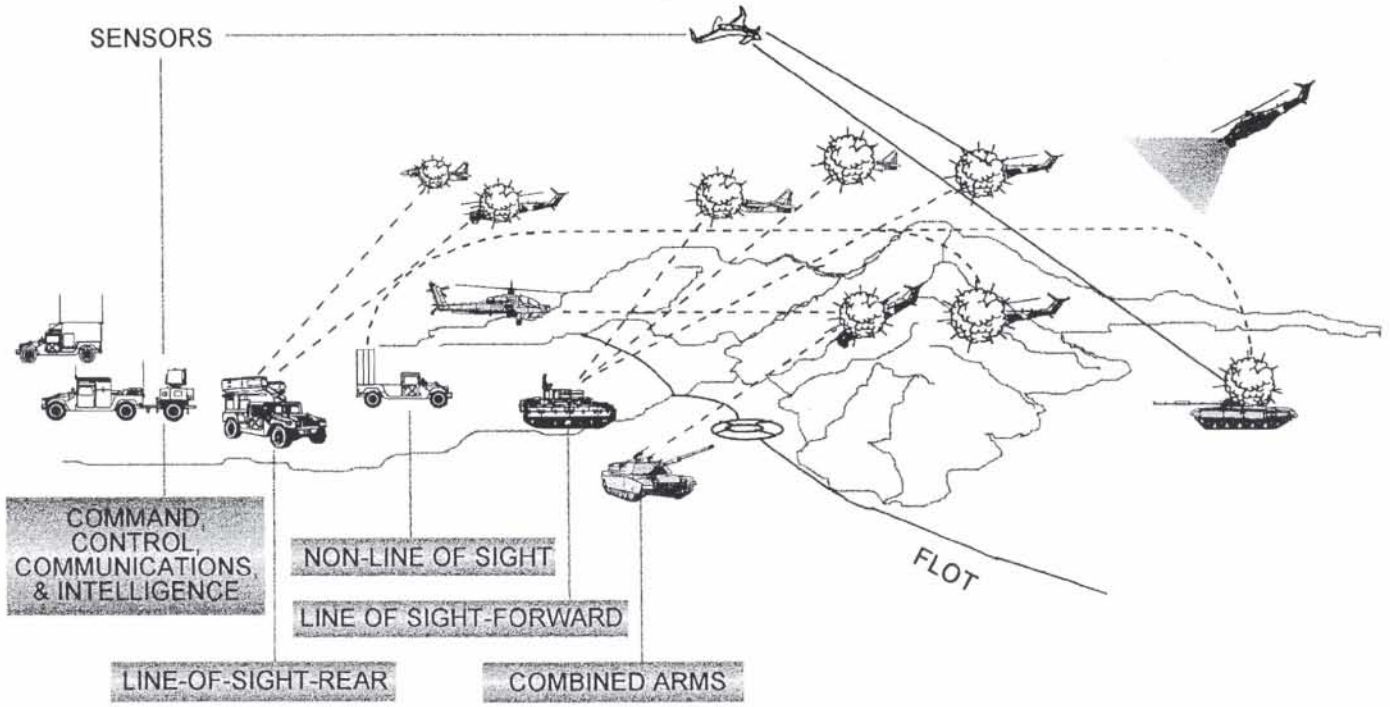
THAAD DESIGN EMBODIES ADTOC PHILOSOPHY



LONG-TERM STRATEGY



FAAD — A SYSTEM OF SYSTEMS



Forward Area Air Defense

The FAAD system-of-systems concept was a Cold War concept conceived before the first cracks in the Berlin Wall became perceptible, but it has proven remarkably adaptable to a new threat matrix and Force XXI requirements. The transformation of the FAAD system, even as fielding was underway, from a Cold War system to a 21st century system is a research, development and acquisition management success story.

The original FAAD system concept envisioned four components. Three systems, the line-of-sight (LOS) component, the non-line-of-sight (NLOS) component and the FAAD command, control, communications and intelligence (C^3I) component, were ADA specific. The FAAD LOS component was divided into the LOS-Forward (LOS-F) and the LOS-Rear (LOS-R) subcomponents.The fourth component was a combined arms initiative designed to improve the capabilities of other combat arms to defend themselves against air attack.

The Army selected the Air Defense/Antitank System (ADATS) as the LOS-F component and the Avenger as the LOS-R component. The Army's Fiber-Optic Guided Missile (FOG-M), which was to seek out and destroy threat helicopters hovering behind obstacles, terrain features or trees, was picked as the NLOS candidate.

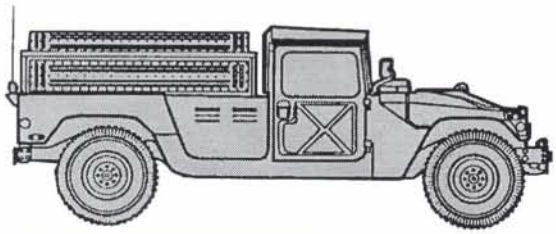
The original FAAD design was quickly torn asunder by the chain of events set in motion by the sudden collapse of the Soviet Union. ADATS funding disappeared along with the Soviet attack helicopter threat it was primarily designed to counter. In its place, the Army substituted the Bradley Stinger Fighting Vehicle (BSFV). Next, the Army transferred proponent responsibility for FOG-M from Air Defense Artillery to the Infantry.

The forward area air defense system is a major research, development and acquisition success story

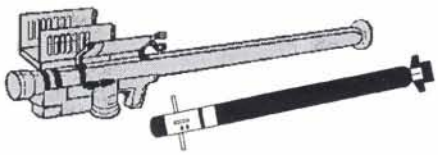
Despite initial setbacks, the FAAD system has regained momentum and is reshaping air defense in the forward area. Avenger fielding is nearly complete, the BSFV has proven an acceptable interim LOS-F solution, and the FAAD C^3I system is demonstrating its ability to leverage Information Age technologies to multiply FAAD combat effectiveness.

Stinger. Stinger proved its combat effectiveness in Afghanistan, where rebel gunners used it to shut down Soviet close combat

STINGER



- HMMWV TRANSPORTED
- BASIC LOAD 6 STINGER MISSILES
- INTEGRATED WITH FAAD C ² VIA SIMPLIFIED HANDHELD TERMINAL UNIT (SHTU)
- STRATEGICALLY DEPLOYABLE BY C-130/C-141B
- CREW SIZE: 2



STATUS

- FAAD: STINGER BASED
- PRODUCTION UNFUNDED AFTER MAR 96
- MISSILE SHORTCOMINGS:
  - LOW (BETA) ASPECT ENGAGEMENTS
  - REACTIVE COUNTERMEASURES
  - PERFORMANCE IN CLUTTER
  - NIGHT ENGAGEMENTS
  - AIR-TO-AIR SUPERELEVATION
  - 10-YEAR BATTERY SHELF LIFE
- RMP BLOCK I AND BLOCK II IMPROVE CAPABILITY AND EXTEND SHELF LIFE
  - BLOCK I:
    - * RMP-1 TESTING ONGOING; FUE 2QFY97
    - * FUNDED FOR 9,973 MISSILES
  - BLOCK II:
    - * RDTE: $218.8M FY00-05 (SHORT $110.5M)
    - * PRODUCTION: $232.2M FY04-10 (BUYS 2,900 MISSILES)

ARMY FIELDING

- BASIC: 8,731 MSLS
- POST: 559 MSLS
- RMP: 29,099 (AT PRODUCTION END)

RMP BLOCK I

- ELIMINATES SUPERELEVATION
- UPGRADES IRCCM CAPABILITY
- IMPROVES:
  - NIGHT ENGAGEMENTS
  - PERFORMANCE AGAINST UAV'S
  - LOW ASPECT ENGAGEMENTS
  - EXTENDS SHELF LIFE

BLOCK II

- SOLVES R/W IN CLUTTER PROBLEM
- IMPROVED PERFORMANCE AGAINST UAV/CRUISE MISSILES
- EXTENDS LOCK-ON
- FULL NIGHT CAPABILITY
- OFF-AXIS ENGAGEMENTS
- ADVANCED IRCCM CAPABILITY

support aviation. Today, the Army is counting exclusively on Stinger to handle the air threat in the forward area. Stinger, the only dedicated FAAD missile, is employed by manportable air defense (MANPAD) teams, Avenger, BSFV, Marine Corps light amphibious vehicle-air defense and special operations forces. The Navy employs Stinger teams on the decks of its warships as a final defense against aircraft that manage to penetrate its air defense umbrella. Air Defense Artillery remains committed to ensuring that Stinger receives full and continued support despite major funding reductions.

The Stinger is a manportable, shoulder-fired, fire-and-forget missile. It weighs about 40 pounds and has an approximate range of five kilometers. Stinger has a small but lethal high-explosive warhead fully capable of destroying threat helicopters, unmanned aerial vehicles (UAVs), cruise missiles and fixed-winged aircraft. An identification, friend or foe (IFF) interrogator provides tentative friendly or unknown target data to the Stinger gunner.

The Stinger comes in three models: basic, post and reprogrammable microprocessor (RMP). Basic Stinger, fielded in 1981, replaced the Redeye missile. It has an all-aspect (head-on) engagement capability and infrared (IR) counter-countermeasure (CCM) capability. Stinger post, fielded in 1985, has a passive optical seeker with rosette scanning features and an ultraviolet channel that improves the missile's performance and IR CCM capability. The Stinger RMP has a microprocessor that can be reprogrammed in the field to overcome advances in threat IR countermeasures.

Stinger missile shortcomings include a low-beta, head-on aspect engagement capability, a lack of specific IR CCMs, poor performance against targets in clutter, a lack of night engagement capability, the air-to-air superelevation requirement, and an insufficient (10-year) battery shelf life.

An already-funded upgrade program called RMP-1 is correcting some of these Stinger deficiencies. This upgrade will improve Stinger's IR CCMs, increase its shallow-aspect engagement performance, eliminate the aviation superelevation requirement and improve Stinger's night engagement capability. The Army will begin retrofitting 8,444 Stinger missiles with RMP-1 improvements in fiscal year 1996. This number is enough to meet most Force Package I (FP-1) requirements (units with top priority deployment status), but additional funding will be required to supply the remainder of the force.

The U.S. Army Air Defense Artillery School and the FAAD program manager are working to obtain funding to field Advanced Stinger, or RMP-2, from fiscal year 2005 through 2012. Advanced Stinger retrofit product improvements will overcome Stinger's most critical deficiency, its inability to acquire and engage standoff rotary-wing targets in heavy background IR clutter. RMP-2 will modify the existing missile

by incorporating an imaging focal plane array seeker. It will also improve Stinger's performance against UAVs, fixed-wing aircraft and IR countermeasures. Both retrofits will replace Stinger batteries, which have 10-year shelf lives, with longer lasting batteries.

Avenger. Avenger, the LOS-R component, was initially designed to provide weighted, attrition-oriented, critical-asset air defense of the brigade and division rear. As the result of the 1993 Division Air Defense Study, which realigned threat priorities, the Avenger has evolved into a counter-reconnaissance, intelligence, surveillance and target acquisition (RISTA) system. It will protect the force, primarily against UAVs, from initial entry operations through decisive operations.

The Army recently decided to reduce the number of Avengers in the division from 36 to 24. V Corps heavy divisions have already been equipped with 24 Avengers each. Army Forces Command units will restructure in the fourth quarter of fiscal year 1995. The Army has approved an Air Defense Artillery School recommendation to add 10 manportable air defense Stinger teams to each heavy division to offset the loss of the 12 Avenger squads.

Avenger fielding will be completed in FY96, but already the Army is working to improve this highly regarded system, replacing Avenger's light high-mobility, multipurpose, wheeled vehicle (HMMWV) carriers with heavy HMMWVs that have stronger suspensions and 200-amp charging systems that will eliminate battery and generator failures. "Bustle racks" will arrive with the heavy HMMWVs, increasing Avenger's equipment stowage capacity.

The new Avenger force-on-force trainer (FOFT) will give Avenger a Multiple Integrated Laser Engagement System-2 capability to ensure Avenger units remain active players on the simulated battlefield when the Core Instrumentation System (CIS) is upgraded at the Army's combat training centers. The Avenger FOFT also will be equipped with player identification and a vehicle detection device that allows interoperability with Air Warrior as well as the CIS. Fielding to the National Training Center is projected during the fourth quarter of fiscal year 1995.

Other good news is that the FAAD program manager has secured funding to equip the entire Avenger fleet with the objective environmental control unit/prime power unit (ECU/PPU). The ECU/PPU provides electrical power, heating, cooling, ventilation and filtered air inside the Avenger turret. Production is already underway, and fielding should begin in December 1995 and continue through March 1997.

The Avenger fielding is nearing completion, and the Army plans to transfer Avenger management from the FAAD program manager to the U.S. Army Missile Command at the end of the fourth quarter, fiscal year 1995.

BSFV. The BSFV protects the heavy combined-arms maneuver task force against aerial attack and surveillance by attack and armed helicopters, fixed-wing close air support aircraft and UAVs. It was initially intended

AVENGER

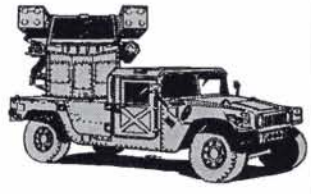
Fielded To:

3 ACR	10 ID
1 CD	2-2 ADA
USAADASCH	2 ACR
OMMCS	5-2 ADA
2 ID	1 AD
24 MX	3 MX
1-2 ADA	82 ABN
101 AASLT	

Currently Fielding:
25 ID

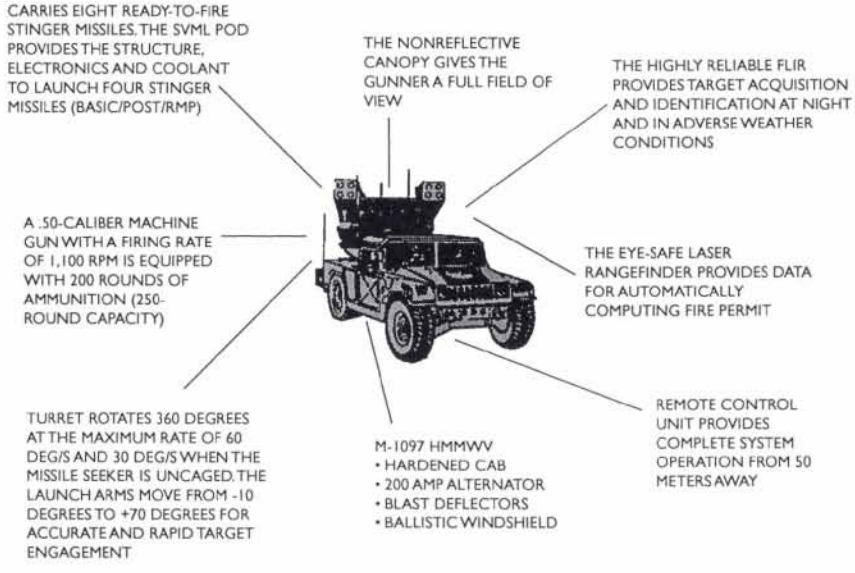
Future Fieldings:

USAADASCH	4QFY95
1-204 ADA	1QFY96
2 AD	2QFY96

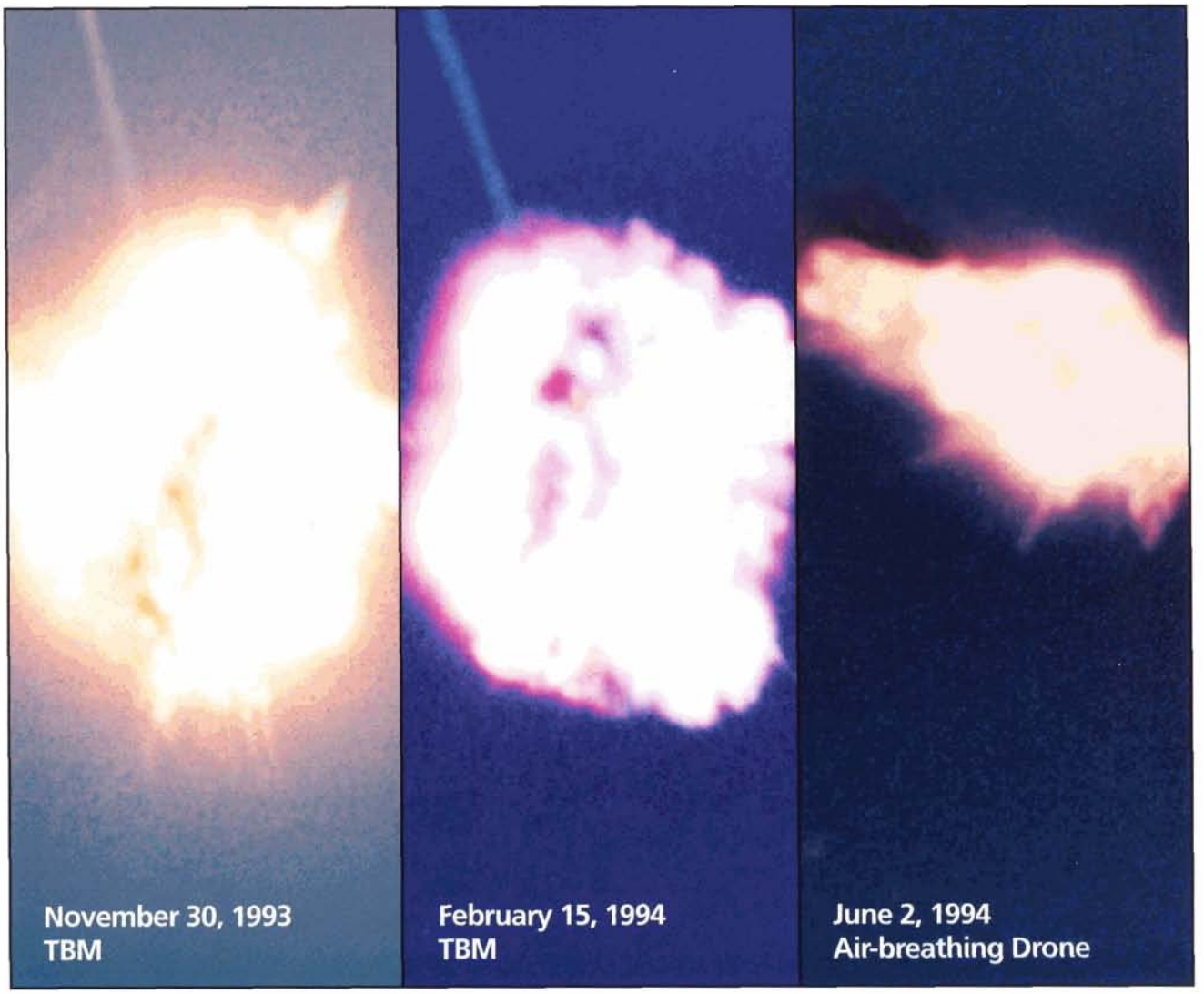


STATUS / ISSUES

• MACHINE GUN	FIELD WITH SYSTEMS	3-4 ADA 2QFY95
	BACKFILLS BEGIN	2QFY95
• HEAVY HMMWV	PRODUCTION LINE CUT IN RETROFIT BEGAN	OCT 93 2QFY95
• BUSTLE RACK	DESIGNED/BUILT - FT BLISS PM FAAD FUNDED FIELD WITH HEAVY HMMWV	FUE 5-5 ADA 1QFY95
• ECU/PPU	FAT COMPLETED	FUE 1QFY96
• COMPLEMENTARY MISSILE STUDY ONGOING		
• HEAVY DIVISION STRUCTURE REDUCED TO 24		
• UNFUNDED	P3I TRAINING DEVICES	
• CONVERTS TO MICOM MANAGEMENT		4QFY95



BSFV-E prototype on target



PAC-3: Hit-To-Kill Success. Three Times

On June 2, 1994, the Patriot Advanced Capability (PAC-3) missile recorded its third straight hit – proving again that the PAC-3 kinetic hit-to-kill missile is ready to meet today's, and tomorrow's, threats.

The PAC-3 is the only proven technology for destroying the tactical ballistic missile threats that face our forces. And now it's shown that it can handle air-breathing targets, as well.

Rather than relying on a proximity detonation that can simply redirect or break up an incoming threat, the PAC-3 hits the target warhead to assure complete destruction.

Led by Loral Vought Systems, the PAC-3 team's success is based on more than 30 years of research in hit-to-kill technology. The PAC-3 employs a fast on-board guidance system, a sophisticated seeker developed by Rockwell Tactical Systems, and a rapid-response airframe – due in part to ARC's attitude control motors – to destroy a wide range of targets.

And with the addition of the PAC-3's unique lethality enhancer, designed to increase the performance envelope against air-breathing targets, no matter what they send up, it's coming down.

LORAL
Vought Systems

ARC
A Unit of Sequa Corp.

Rockwell

BSFV

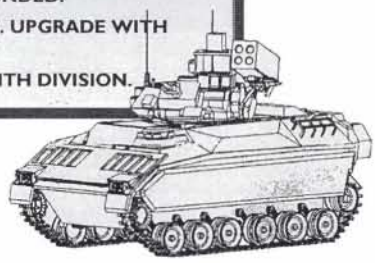
Fielded To:		Currently Fielding:	Future Fieldings (Projected):	
3 MX	1 CAV	278 ACR	3 ACR	2QFY96
1 AD	AFLOAT (PREPO)			
2 ID	2 AD			
4 MX	NTC			
USAADASCH	1 MX			
24 MX				

- ENHANCED SURVIVABILITY
  - REDUCED SIGNATURE
  - MORE ARMOR
- INCREASED FIREPOWER
  - STINGERS FORWARD IN SURVIVABLE MODE
  - 25MM CHAINGUN EFFECTIVE IN AD ROLE
- ENHANCED MANEUVER CAPABILITY
  - SUPERIOR SPRINT SPEED/AGILITY
  - ABILITY TO MANEUVER WITH SUPPORTED FORCE
- ENHANCED TARGET ACQUISITION
- CREW SIZE: 5

PROTECTS THE HEAVY COMBINED ARMS TASK FORCE

STATUS

• STINGER RACKS	INTERIM RACK FIELDED TO USAREUR AND KOREA. OBJECTIVE RACK FUE 4 MX, 3QFY93. CONUS RETROFIT BEGINS 3QFY95.
• BSFV GROWTH STUDY	DETERMINE LOW COST, INCREMENTAL BLOCK IMPROVEMENT TO UPGRADE CAPABILITIES.
• BSFV TURRET STUDY	REVIEW EXISTING BRADLEY COMPATIBLE AIR DEFENSE TURRETS.
• BSFV-E	ADL DEMONSTRATED BSFV POTENTIAL TO INTEGRATE INCREMENTAL GROWTH PACKAGES. ACCELERATED ACQUISITION PROGRAM APPROVED BY MS IIIA ASARC. RSTE FUNDED; PRODUCTION UNFUNDED.
• ODS UPGRADES	FP-1 AND FP-2 ONLY. UPGRADE WITH DIVISION.
• A3 UPGRADES	FP-1 ONLY. FIELD WITH DIVISION.



as an interim replacement for the self-propelled Vulcan until the objective LOS-F-H component, ADATS, could be fielded. When ADATS was canceled in January 1992, the BSFV became the interim LOS-F-H system.

The BSFV is essentially identical to the Bradley Infantry Fighting Vehicle, except for Stinger missile stowage and ancillary equipment. It has a five-man crew, consisting of a driver, gunner, Bradley commander and a two-man Stinger team.

The Stinger missile is the BSFV's primary air defense weapon while the 7.62mm coaxial machine gun provides self-defense against surface targets. Modifications to accommodate the Stinger team include a curbside Stinger rack and a roadside storage box that holds battery coolant units, two gripstocks, a radio, binoculars and an IFF system. Two seats for the Stinger team chief and gunner have also been added roadside.

BSFV battalions in Korea and Germany initially received interim Stinger racks to provide an immediate warfighting capability. The delivery of objective racks, originally scheduled for the third quarter of fiscal year 1994, was delayed until the second quarter of this fiscal year due to a contractor sole-source legal challenge. Stateside battalions presently are equipped with the objective racks. Stinger rack retrofit to overseas units is scheduled for the third and fourth quarters of this fiscal year.

In May 1992, the Air Defense Artillery School asked the Program Executive Office-Air Defense to initiate a BSFV growth study to identify recommended solutions to three primary BSFV shortfalls: survivability (Stinger teams have to dismount and expose themselves to hostile fire to engage aircraft), target acquisition and identification, and fire control. In September 1993, Congress provided the Army, under the management of the ground-to-air missile program manager, $7.75 million to investigate the possibility of integrating existing air defense turrets into the BSFV. Proposals from Boeing, United Defense and Martin Marietta were evaluated via virtual prototype simulation to determine weapon effectiveness and combined arms distribution. The study also investigated potential incremental upgrades and enhancements, now referred to as the BSFV-Enhanced, or BSFV-E.

The BSFV-E replaces the TOW launcher on the BSFV with a four-missile Stinger launcher that enables the BSFV crew to launch missiles without dismounting the Stinger team. Other BSFV-E improvements include a Stinger sight reticle, which provides the gunner with slew-to-cue target alignment, FAAD command and control (C^2) integration, and a night engagement capability. These modifications reduce the size of the crew from five to four.

The Air Defense Lab has conducted a series of successful BSFV-E hardware demonstrations that proved the weapon system could effectively acquire, track and engage surrogate threat and subscale moving targets

from inside the vehicle. As a result, the BSFV-E has been selected as a rapid acquisition initiative. It will participate in Task Force XXI experiments and exercises.

In March 1995, the FAAD Project Office awarded Boeing a contract to produce eight BSFV-E prototypes for Task Force XXI. The next step will be to field production models for FP-1 (top priority) and FP-2 (second priority) units.

The Bradley Fighting Vehicle program manager will also integrate a series of Bradley modifications known as Operation Desert Storm (ODS) upgrades and A3 upgrades and improvements. Significant ODS upgrades include a laser rangefinder, global position system/positive navigation (GPS/Pos Nav), driver thermal viewer, combat identification and improved restowage. Significant A3 upgrades include the ODS upgrades plus a digitized data bus, second-generation forward-looking infrared system, C^2 enhancements and ballistic fire control. Other upgrades are a commander independent viewer, protective armor tiles and roof fragmentation protection. ODS upgrades will be fielded to FP-1 and FP-2 units during fiscal years 1996 and 1997. A3 upgrades will be fielded from fiscal years 2000 through 2007 to FP-1 units only.

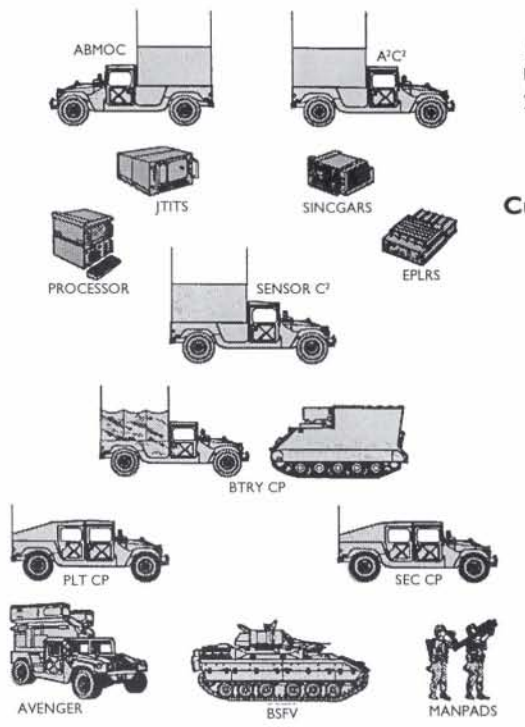
FAAD C³I. Digital information technology that will allow the Army to pass essential information to all levels is the linchpin of Force XXI. FAAD C^3I makes Air Defense Artillery a leader in battlefield digitization. It provides the maneuver commander with a third-dimension situational awareness that will be critical to success on future battlefields.

The FAAD C^3I system consists of the light and special division interim sensor (LSDIS), ground-based sensor (GBS) and automated C^2 subsystems to pass targeting and C^2 information and orders to FAAD systems.

The automated C^2 subsystems are composed of remotable common hardware and software processors, displays, specialized software and communications equipment. The components are the air battle management operations center (ABMOC) node; Army airspace command and control (A^2C^2) node; sensor C^2 node; battery, platoon and section command posts; and simplified, handheld [computer] terminal unit (SHTU).

The ABMOC, a part of the battalion tactical operations center (TOC), is the centerpiece of the C^2 system. Housed in a standard integrated command post shelter (SICPS) mounted on a heavy HMMWV, the ABMOC

FAAD COMMAND AND CONTROL



Fielded To:

101 AASLT
USAADASCH
21D

Currently Fielding:

24 MX

Future Fieldings: *Projected

10 ID	4QFY95	3MX	3QFY98
2 AD	3QFY96	*RO	1QFY99
82 ABN	3QFY96	5-2 ADA	4QFY98
1 CD	2QFY97	25 ID	3QFY99
3 ACR	3QFY97	*RO	1QFY00
1-2 ADA	4QFY97	AMC	3QFY99
1-204 ADA	1QFY98	*PDSS	
1 AD	2QFY98	2-2 ADA	4QFY99
*RO	1QFY99	2 ID RO	1QFY00
		11 ACR	2QFY00
		2 ACR	3QFY00

STATUS

BLOCK I - (LSDIS)

- SUCCESSFUL FDTE/LUT FEB 93
- FUE, 101 AASLT, 30 SEP 93

BLOCK II - (GBS)

- SUCCESSFUL FDTE/IOTE, 4QFY94/1QFY95
- OSD DOWNGRADED TO ACAT IC
- MSIII ASARC, 3QFY95
- FUE, 24 MX, 3QFY95
- FUNDED FOR 19 SETS

BLOCK III

- CONTRACT AWARDED, 8 SEP 94
- BEGINS FAAD C^2 MIGRATION TO ACOE
- TOC AUTOMATION

is the primary interface for receipt of external air tracks from airborne warning and control systems (AWACS) via Joint Tactical Information Distribution System (JTIDS) radios and from TMD systems via multiple subscriber equipment (MSE).

The ABMOC processes, filters and displays external air tracks on a 400-by-400 kilometer high-resolution situation display. It monitors and displays air defense C^2 information and automatically broadcasts engagement operation information to the sensor C^2 subsystems via digital data radios. ABMOC force operations functions include an interface with other battlefield functional areas via MSE and include defense planner software that enables S-3s to plan and analyze the effectiveness of air defense coverage.

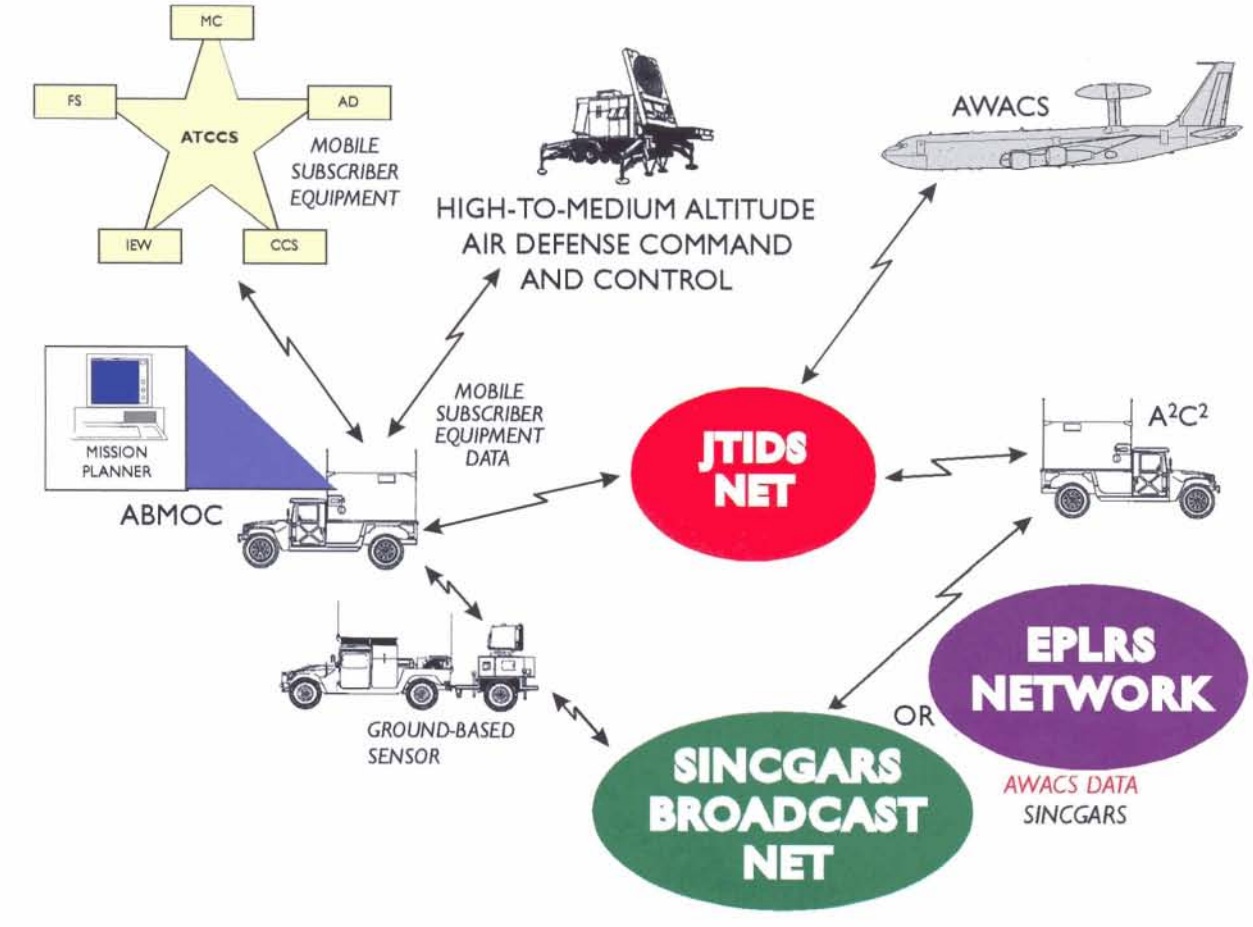
FAAD C³I makes Air Defense Artillery a leader in battlefield digitization

The A^2C^2 node, located at the division TOC, monitors the same division air picture as the ABMOC and disseminates engagement operations information and orders. The A^2C^2 is the identification authority for the FAAD C^3I system and manages battlefield control measures by establishing and disseminating airspace restrictions and battlefield geometries to subordinate units. The A^2C^2 shelter is configured like the ABMOC. Its redundancy provides continuity of operations when the ABMOC is moving or nonoperational.

The sensor C^2 node receives external air tracks and engagement operations information from the ABMOC and or A^2C^2 via digital data radio. These external tracks are processed, filtered and correlated with local sensor tracks, then broadcast to elements in the sensor's area of interest; i.e., battery, platoon and section command posts, fire units and combined arms elements.

The battery, platoon and section command posts receive digital data and battle management messages from their local sensor C^2, then process, filter and display the air situation to their operators. The battery command post situational display (up to 400-by-400 kilometers) helps commanders decide how to

ABMOC INTEGRATION



deploy subordinate platoons and provides situational awareness to supported brigades. The platoon and section command post consists of a SHTU unit with a situational display (up to 80-by-80 kilometers) that helps the platoon and section leaders decide how to deploy their weapon systems.

The fire units receive, process and filter engagement information from the sensor C^2 node via digital data radios and display engagement priorities, target identification and weapons control orders on a SHTU. This enables gunners to maximize weapons effectiveness by engaging targets at maximum range.

FAAD C^3I has been developed in a structured block design that allows incremental development based on lessons learned, user inputs and emerging tactics, techniques and procedures. This approach also permits the future incorporation of improved hardware, software, sensors, communications, weapon platforms, integrated weapon displays, target identification systems and battlefield automation interfaces.

The Block I system, fielded to 2-44 ADA in the fourth quarter of fiscal year 1993, incorporates initial engagement operations, partial air battle management, initial simulation and training, and initial defense planning. The ABMOC subsystem receives AWACS via JTIDS radios and broadcasts via single-channel ground and airborne radio systems (SINCGARS) to the sensor C^2 subsystem. The sensor C^2 node correlates the external AWACS air picture with its local two-dimensional LSDIS radar and broadcasts engagement operations with six-second updates via simplex SINCGARS digital data nets to subordinates in its area of interest.

Block II will improve force and engagement operations and add an interface with the three-dimensional GBS, as well as maintaining an interface with the LSDIS. It also will provide a sensor netting capability and broadcast two-second updates via the Enhanced Position and Location Reporting System (EPLRS). Improved data communications (speed and input) and automated interface with the Global Positioning System will provide duplex data communications and "up-tell" of subordinate system air battle management information to higher echelons. Along with external tracks from AWACS and high- to medium-altitude air defense systems, this will provide a complete situational air picture of the division's battlespace down to fire units.

The Army has just completed the Block II initial operational test and evaluation. It has funds to field 19 sets, enough to equip all active component FAAD units, one corps Avenger battalion and the training base.

The Army awarded the Block III software contract in September 1994. This build begins the migration of FAAD C^2 to the Army's common operating environment. A series of annual "software drops" will incrementally improve FAAD C^3I operations and provide EPLRS and SINCGARS simulcast and Army Aviation interface. It will also automate TOCs, permit up-tell via TADIL-B to Patriot and adjacent FAAD units, and automate the interface between engagement and force operations.

FAAD C^3I integrates real-time alerting and cueing into divisional air defense

Block IV will provide horizontal and vertical (engagement operations and force operations) pre-planned product improvements (P^3Is) to Block III capabilities. P^3Is, scheduled for fielding in fiscal year 2000 and beyond, will give A^2C^2 and battalion and battery command posts on-the-move C^2 capabilities commensurate with supported forces. They will increase horizontal interoperability (Army and joint services) by interfacing the air defense mission planner with other battlefield mission planners. P^3Is will also improve access to intelligence data by interfacing the commander's tactical terminal with the Joint Intelligence Net. As an A^2C^2 interoperability enhancement, P^3Is will give FAAD C^3I components the capability to automatically receive, process and display elements of the airspace control orders issued by the joint force air component commander.

Recently fielded FAAD C^3I sensors, the LSDIS and objective GBS, are the most visible FAAD C^3I components.

LSDIS. The LSDIS is a lightweight, ruggedized, transportable sensor designed for ease of operation and maintenance to support the light and special divisions. It operates in

the L-band, has a detection range of 20 kilometers up to three kilometers in altitude and provides two-dimensional target tracking data. It can be march ordered in less than 10 minutes and emplaced in less than 15 minutes. The Army has funds to field 40 LSDISs.

Two improvements have been developed since initial fielding began in 1994. The first improvement modifies the LSDIS control interface and data processing unit, eliminating the SHTU as the protocol device between the LSDIS and FAAD C² software. An enhanced control indicator unit, as a value-added program manager initiative, will also provide a LSDIS continuous operations capability that will provide LSDIS track data directly from the radar via SINCGARS to SHTUs in support of air assault and airborne operations. The second improvement modifies the radar processor to improve helicopter detection in clutter.

FAAD C³I sensors incorporate advanced technologies

These improvements will be included in all fieldings, beginning with 5-5 ADA. Previously equipped units will be retrofitted in the fourth quarter of fiscal year 1995.

GBS. Hughes' GBS, the objective sensor, is an advanced three-dimensional sensor that detects, identifies and tracks helicopters, fixed-wing aircraft, UAVs and cruise missiles. It can operate with the FAAD C³I, as a sensor node or as a stand-alone sensor, providing track data directly to FAAD fire units. It incorporates a Mark XII IFF and electronic CCM capability, has a detection range of 40 kilometers at an altitude of up to four kilometers, and can be march ordered in less than 10 minutes and emplaced in less than 15 minutes. Funds are available to purchase 115 GBS radars, enough to equip all active component battalions, one reserve component battalion and the training base.

The pre-production version of the GBS used a five-ton trailer for the generator and radar signal processor van. However, the objective system is a reduced-sized HMMWV variant that has been operationally tested and is currently completing technical tests. The variant eliminates the processor van by downsizing the radar processor and mounting it on the radar trailer. The generator will be mounted in the bed of the HMMWV. The HMMWV variant significantly increases mobility and deployability, enhances survivability and improves sustainability.

The U.S. Army Operational Evaluation Command (OEC) recently completed its analysis of the FAAD C² Block II and GBS initial operational test and evaluation conducted at Fort Hood, Texas, and Oro Grande Range, N.M., by soldiers of 4-5 ADA, 1st Cavalry Division, and 1-5 ADA, 24th Infantry Division. Results showed FAAD C³I enhances

LSDIS

Fielded To:

USAADASCH
101ST ABN (AASLT)
2 ID

Future Fieldings:

10 ID	3QFY95
82 ABN	4QFY95
1-2 ADA	1QFY95
2 ID RO	2QFY96

STATUS

- OCT 91: TECHNICAL/OPERATIONAL TESTING
- NOV 91: PEO-AD CONDITIONAL ACCEPTANCE TEST
- MAY 92: USER VALIDATION & VERIFICATION TEST
- MAY-JUL 93: PRODUCTION QUALIFICATION TESTING II
- SEP 93: CONDITIONAL RELEASE APPROVED
- OCT-DEC 94: FUE 101 AASLT
- ENHANCED COMMUNICATION INTERFACE UNIT (ECIU)
  - REPLACES SHTU AS PROTOCOL DEVICE
  - FUE: 5-5 ADA, 2D, 3QFY95
  - RETROFIT PROJECTED FOR 101ST/USAADASCH, 4QFY95

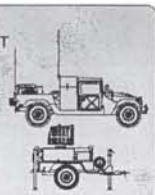
GBS

Training Base Fieldings:

USAADASCH	2QFY97 3QFY98 4QFY01
FORT SILL	2QFY97 3QFY97

STATUS

- OBJECTIVE SYSTEM: HMMWV VARIANT
- RELIABILITY TESTING, FEB-MAR 95
- LRIP DECISION 1QFY95
- SUCCESSFUL FDTE/IOTE 1QFY95
- OSD DOWNGRADED TO ACAT IC
- MSIII ASARC, 3QFY95
- AAO INCREASED TO 115
  - RECENT POM-TO-BUDGET SUBMISSION INCREASED PRODUCTION QUANTITY FROM 77 TO 95
  - EPA ADJUSTED TO FUND ADDITIONAL 20
- 24 MX WILL FIELD PRE-PRODUCTION ST VARIANT



Future Fieldings: (*projected retrofit)

TF XXI	4QFY96	1 AD	2QFY01
FORCE XXI	3QFY97	1 AD RETRO	3QFY01*
FORCE XXI RETRO	4QFY97*	3 MX	2QFY01
24 MX	1QFY98	3 MX RETRO	3QFY01*
82 ABN	2QFY98	5-2 ADA	4QFY01
10 ID(L)	4QFY98	2 ID	1QFY02
101 AASLT	2QFY99	2 ID RETRO	3QFY02*
1 CD	4QFY99	25 ID(L)	2QFY02
3 ACR	1QFY00	25 ID RETRO	3QFY02*
1-2 ADA	2QFY00	2-2 ADA	4QFY02
1-204 ADA	4QFY00	11 ACR	1QFY03
2 ACR	2QFY03		

battalion command and control and force protection. With sensor netting, it also provides seamless, uninterrupted continuity of operations. Both systems were rated operationally effective and suitable. OEC recommended type classification and full material release for both and decided further operational testing is not required. OEC presented the results to the preliminary Army Systems Acquisition Review Council on March 10, 1995, to support the Milestone III full-production decision.

1-5 ADA, which was the first unit to receive GBSs, will initially be equipped with four pre-production versions mounted on the pre-production five-ton trailers. These sensors will be displaced by the HMMWV variant in fiscal year 1998.

Manuever commanders acknowledge the vulnerability of power-projection forces to sophisticated air platforms.They know that the success of post-Cold War era operations will likely be measured in inverse proportion to casualties. "The significance of any small numbers of casualties, as the recent public reaction to casualties in Somalia demonstrates, has been greatly multiplied." said Maj. Gen. Wesley K. Clark, 1st Cavalry Division commander. "This increases the importance of high-resolution air defense." Only the FAAD system of systems can counter a forward area air threat that is growing in variety and lethality.

There is no need to argue the essentiality of Air Defense Artillery's TMD system of systems (THAAD, Patriot and Corps SAM) to Force XXI. During Operation Desert Storm, Saddam Hussein's Scud attacks provided a prime-time briefing on the need for battlefield missile defense. "I believe that theater missile defense is the most pressing long-term regional military dilemma in our theater," stated Gen. J. H. Binford Peay III, commander in chief, U.S. Central Command. "Consequently, space-based capabilities and theater missile defense systems are essential to our ability to deter, to fight and to win future conflicts."

Force XXI will be vulnerable to the third-dimension threat in every phase of operations from initial entry through decisive operations to subsequent redeployment. It can count on the U.S. Air Force to quickly establish air superiority in any theater of operations, but it cannot rely on the Air Force to protect it from the 21st century air threat in its full array. Only Air Defense Artillery can counter the full spectrum of the air threat.

ADA weapon systems are the right weapon systems, at the right place, at the right time to furnish the theater-wide, high-resolution air defense that commanders in chief covet. We are forging an ADA arsenal that will be fully capable of protecting Force XXI on battlefields of the 21st century.

Brig. Gen. Joseph M. Cosumano Jr. is Deputy Commanding General, U.S. Army Air Defense Artillery Center and Fort Bliss, Texas, and Assistant Commandant of the U.S. Army Air Defense Artillery School.

Whittaker and the Air Defense Community

Providing Air Defense Trainers, IV&V, and Data Link Simulators

Supporting Air Defense with New Technology Since 1978

Whittaker

1785 Voyager Ave., Simi Valley, California 93063
Phone: (805) 584-8200 Fax: (805) 584-8306

ADA Association Taps CFC Funds

by Col. Charles W. Hurd Jr.

The Army is working at an increased operating tempo as it prepares for the transition to Force XXI, and so is your ADA Association. We have recently taken on a new task, the sponsorship of the ADA Regimental Window project. At the same time, we are working to raise funds for a new ADA Museum facility while carrying out our traditional mission of supporting ADA soldiers.

To accomplish these tasks, we have secured an important new source of funding. This year, for the first time, the Sun Country Combined Federal Campaign (CFC) will list the ADA Association in its catalogue. You can earmark your tax-deductible CFC contributions for the association by designating No. 3424 on your payroll deduction form.

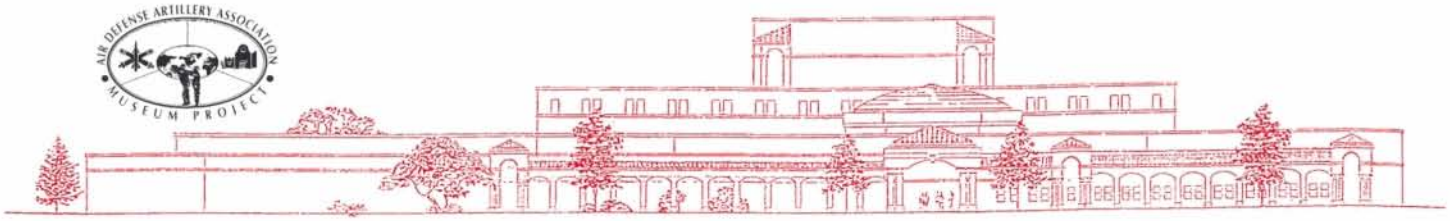
Membership growth is also a bright spot. On Nov. 7, 1994, SSgt. Thomas Burnside, 94th ADA Brigade, became our 6,000th life member. Since then, more than 100 new members have joined our ranks. Thanks to Lt. Col. Bruce Davis, commander of 3-265 ADA, we have a new chapter, the Gulf Coast Chapter. Lt. Col. Michael Wilson, meanwhile, is spearheading a membership drive within the Army National Guard air defense community. Corporate membership now stands at 62.

The campaign to raise money for a new museum building remains top priority. Although the campaign is in its early stage, contributions include: federal real estate valued at $150,000, architectural services worth $10,000, public relations services valued at $2,500, free printing and stationery worth $500, corporate and foundation donations of $42,000 and contributions from ADA units and association chapters of more than $2,000, including a $1,000 contribution from B Battery, 1st Battalion, 56th Air Defense Artillery.

The campaign deserves the support of air defenders worldwide. We urge all ADA units and chapter members to accept the challenge of making the new museum a reality.

We have mailed brochures to unit commanders describing the ADA Regimental Window project. The stained-glass windows with their brilliant regimental shields are the centerpiece of the Chief of Air Defense Artillery's efforts to renovate the branch's flagship building, the Air Defense Artillery Center's headquarters. Windows installed or reserved to date include the 1st, 2nd, 3rd, 4th, 6th, 7th, 35th, 43rd, 44th, 56th, 59th, 60th, 61st, 62nd, 67th and 251st Regiments and the 6th, 11th, 35th, 94th and 108th Brigades. Other windows represent ADA enlisted soldiers and the ADA Officer, Warrant Officer and Noncommissioned Officer Corps.

Force XXI will be very different than the Army we know today, but it will still depend on heritage and tradition to sustain it on the battlefield. The ADA Association will play an important role in the transition to Force XXI by ensuring that the heritage and traditions of Air Defense Artillery are carried forward into the next millennium.



Wonderful treasures of national significance and interest are stored in buildings all over Fort Bliss, Texas, unseen by anyone except the museum staff. They include rare weapons and vehicles that have been carefully collected for the day when they can be restored and shown free of charge to the American people in award-winning exhibits of a caliber already established by the certified and accredited museums at Fort Bliss.

The U.S. Army Air Defense Artillery Association, an IRS 501(c)(3) tax exempt non-profit organization, has initiated a Capital Campaign for a new building to house the Air Defense Artillery Museum and later, the Fort Bliss Museum and Museums Division which also operates the 3rd Cavalry Museum.

This new facility will be an exciting focal point for cultural and historical interests for Fort Bliss and El Paso, presented to a major tourist audience.

The building will house permanent and temporary galleries, education and meeting spaces, an auditorium, and many other features. Galleries will present the history of Air Defense Artillery and the evolution of its hardware from the rare guns and fire control equipment of 1917 to today's modern equipment, in life-size walk-through dioramas with the artifacts in the context of their use by American soldiers.

The Museums Division has developed a Children's Bicultural Living History program and military training programs for formal training and professional development. The new building will provide more space for programs that will benefit everyone in the expanded community which includes the soldier and his family, citizens of El Paso-Juarez and the Interstate 10-Houston-Los Angeles tourist corridor.

Designs and renderings are complete and the engineering work and drawings are underway. All that is needed now are construction funds. The museum will be operated as an appropriated fund activity of the U.S. Army with a professional staff. No funds will be used for operations, only for "mortar and bricks."

One-time gifts and multi-year pledges are being sought for erecting the facility. All Donors will be recognized commensurate with the amount of their gifts. Be a part of this exciting effort. Please give generously and visit our museums to follow their progress. Please use the attached donation form or call (915) 568-2711 for further information.

In response to your appeal for support of this exciting and worthwhile project

enclosed is a check in the amount of: $ _____

Please charge my Visa/Master Card No. _____

Expiration Date _____

Signature _____

From: Name _____

Address _____

Please Address All Gifts to The Air Defense Artillery Association • P.O. Box 6101, Fort Bliss, Texas • 79906

The MEVATEC Team

is pleased to bring a wealth of

Experience
Expertise
Enthusiasm

to the

Program Executive Office
Missile Defense Support Contract

Phone: 205-830-3776 ◆ Fax: 205-830-3778

LIMITED EDITION PRINT

REMAGEN BRIDGE

482ND ANTIAIRCRAFT ARTILLERY (AUTOMATIC WEAPONS) BATTALION (SELF-PROPELLED), MARCH 8, 1945

JOHN PAUL JONES

On March 7, 1945, U.S. 9th Armored Division soldiers found, to their amazement, that the railway bridge across the Rhine at Remagen, Germany, was intact. As GIs attempted to cross the bridge, retreating Germans detonated explosive charges. The bridge heaved into the air, but did not collapse. U.S. units rushed to exploit the bridgehead. The 482nd Antiaircraft Artillery (Automatic Weapons) Battalion (Self-Propelled) reached the bridge at 2030 hours and rushed an M-16 Quad .50 half-track, the thirteenth U.S. vehicle to cross the Rhine, across to the far bank. Other antiaircraft artillery units rapidly converged. On March 8, eight Stuka dive bombers approached the bridge. Not a single plane survived the wall of steel that rose to meet them. As masses of men and materiel crossed the bridge, AAA units integrated their firepower to fight off continuous air attacks until heavy losses forced the enemy to abandon their efforts.

OWN YOUR OWN COPY!

"Remagen Bridge" has been selected as part of the Army's "ADA in Action" series of artwork. To purchase your limited edition print, send a check or money order to the ADA Association. Proceeds go toward a new ADA Museum to preserve the history and tradition of the "First to Fire" branch.

YES! Please rush me a limited edition print of Remagen Bridge.

Image: 26" x 20"
Edition: 500
Price: $50.00
Shipping: $5.00

Name _____
Unit _____
Station _____
Address _____
City _____ State ____ Zip _____

MAIL TO: ADA Association, P.O. Box 6101, Fort Bliss, TX, 79916

Lockheed Martin is developing THAAD for the U.S. Army.

THAAD.
Real protection for the real world.

Today more than 20 countries have the capability to launch ballistic missiles. These weapons of terror have outpaced the world's ability to defend against them.

THAAD, the Theater High Altitude Area Defense system being developed by Lockheed Martin, will provide wide area protection against all existing and projected theater missile threats. Our hit-to-kill technology is a dramatic improvement over today's limited point defense capabilities. The prototype system will be in the hands of U.S. Army troops in late 1996.

Lockheed Martin has a proud history of innovation and success in defensive missile systems. With more than 20 years experience, we are the only company to demonstrate a successful intercept outside the atmosphere.

All of which leads to one undeniable conclusion: When America needs ballistic missile defense, America turns to Lockheed Martin.

LOCKHEED MARTIN

POISED AND READY

The U.S. Army's CORPS SAM program will provide the nucleus of coalition air defense on the new world battlefield. With a fully integrated strategy capable of defeating tactical ballistic and cruise missiles as well as enemy aircraft, it will serve as a basis for an American-European medium range extended air defense system (MEADS).

Hughes and Raytheon have joined forces to propose a flexible, broadly based air defense systems design that effectively counters all emerging air threats and supports the Army's CORPS SAM objectives. The Raytheon-Hughes team is recognized around the world for its leadership in the development of air defense, missile and battle management systems, with unmatched experience in large scale systems integration, technical innovation, and management of international programs.

The CORPS SAM architecture from Raytheon-Hughes will successfully meet the demands of coalition warfare in the 21st Century.

HUGHES • RAYTHEON